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VOL. 25, NO. 10 OCTOBER 1949

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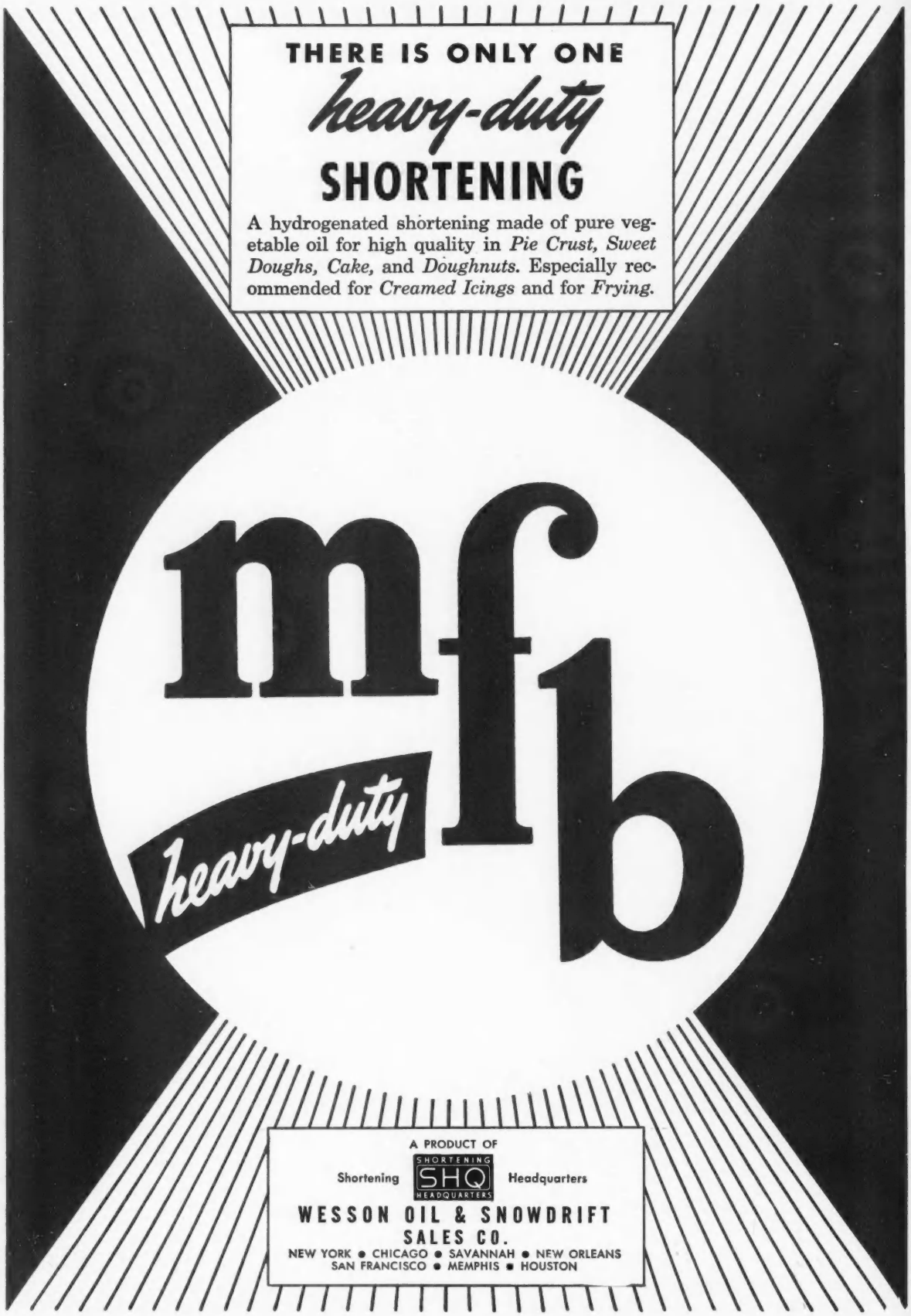
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The Historical Development of Metabolism Studies[1]

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METABOLISM began when life began, for without metabolism there is no life. We have no idea when early man first recognized that there was any relation between the food he ate and the energy and materials that he expended, but probably he realized that when he did not get enough to eat he became thin and when he got enough to eat he regained his former size. Probably he did not know or reason that if he constantly ate too much he became overweight, just as today there are some persons who do not know or will not believe that overweight is simply a matter of eating too much.

Lusk (1) in a small volume on nutrition has given many excerpts from the writings of early medical authorities which show that ideas on diet and nutrition were frequently coupled with the states of health and disease. The earliest citation by him on what might be called a respiration experiment was the experiment of Erasistratus (310 to 250 B.C.) who "put fowls in a jar and then weighed them and their excreta both before and after food." He thus was about two thousand years before Sanctorius.

Sanctorius (2) in 1614 published his noted work on insensible perspiration. He sat in a chair suspended from a large steelyard. He weighed himself before each meal and then stopped eating when the scale showed that he had regained his former weight. He thus learned not only that there were losses in weight due to liquid and solid excreta but also that there was an "insensible perspiration." The modern version of this type of observation is the study of Benedict (3) in 1923 who subsequently with Root (4) in 1926 showed that insensible perspiration and heat production were parallel and that an approximate estimate of the total metabolism could be obtained from the measurement of insensible perspiration.

Modern metabolism studies began with Lavoisier (5) who in 1777 reported that animals confined in a closed space absorbed oxygen and gave off carbon dioxide. In 1789 Lavoisier and Seguin (6) made their respiration experiments on man without food at two environmental temperatures, thus determining the first basal metabolism values on a human subject. They used a face mask and the expired air was collected and analyzed for carbon dioxide and oxygen. The basic facts they found were that metabolism increased 10 per cent after exposure to cold, 50 per cent after food, 200 per cent after exercise.

Allen and Pepys (7) in 1808 used an apparatus for humans in which the subject breathed through a mouthpiece and inspired from and expired into gasometers using valves operated by hand. Only the carbon dioxide was determined.

Nine years later, Nysten (8) studied the chemistry of respiration in disease by separating inspired and expired air by means of a valve, and collecting the air in a bladder. He determined carbon dioxide and oxygen.

A copper mask with rubber edges fitted to the face was employed by Andral and Gavarett (9) in 1843. A valve was used and the expired air collected in glass globes and analyzed for carbon dioxide.

In 1859, Smith (10) used a metal mask with valves and a meter to measure inspired air and a train of absorbers for water and carbon dioxide.

Speck (11) in 1871 used a pair of gasometers, one for inpired air and one for expired air with valves to separate inspired and expired air. The expired air was analyzed for carbon dioxide and oxygen.

Regnard (12) in 1879 collected the expired air in a rubber bag of about 200-liter capacity. The breathing was through a mouthpiece with expired and inspired air separated by valves. The air in the bag was later analyzed. The modern counterpart of the bag method is the wedge-shaped bag described by Douglas (13) in 1911 and much used in metabolism studies of muscular work.

Geppert (14) reported measurements of the total expired air by a wet meter and had an arrangement for drawing duplicate proportional samples directly into a gas analysis apparatus. The samples were subsequently analyzed for carbon dioxide and oxygen.

A principle in the determinations of the respira-

[1] Presented at the 31st Annual Meeting of the American Dietetic Association in Boston, on October 20, 1948.

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tory exchange that is very simple, theoretically, was adopted by Hanriot and Richet (15) in 1891. They employed three meters in series. The first measured the inspired air, the second the expired air, and the third the expired air after carbon dioxide was absorbed. A mask and valves separated the inspired and expired air.

In 1909 appeared the first description by Benedict (16) of an apparatus for determining the gaseous exchange and respiratory quotient of man in short periods. This was of the closed circuit type and employed the principle used in the large respiration calorimeters in Wesleyan University at Middletown, Connecticut, and in the Nutrition Laboratory at Boston. This apparatus subsequently went through a number of changes until at the present time we have a simple apparatus for the determination of oxygen only, and either this apparatus itself or various apparatus based on the same principle are used in the determinations of basal metabolism.

CHAMBERS OR ROOMS FOR METABOLISM STUDIES

Let us turn now to apparatus of the type of chambers or rooms for determining respiratory exchange. Lavoisier was the first again to use it for animals and, although he worked on a chamber for men, its description was never published.

Scharling (17) in 1843 had a chamber of 1 cu. m. content suitable for humans.

Regnault's and Reiset's celebrated work on respiration of animals in which they used the closed circuit type of apparatus was published in 1849 (18). They found that the ratio between the carbon dioxide given off and oxygen used depended on the nature of the food rather than on the species of animals, as well as many other facts well known today.

In 1862, Pettenkofer (19) constructed a chamber large enough for a man to stay in for 24 hr. or more. The chamber was ventilated and the ingoing and outgoing air were continuously proportionately sampled for water vapor and carbon dioxide.

Eight years later Liebermeister (20), in 1870, worked out a chamber suitable for man and of such a shape that the subject could sit or recline. Carbon dioxide only was determined.

The open circuit type of chamber apparatus for men in the United States was the respiration calorimeter developed in Middletown, Connecticut and described in 1897 by Atwater and co-workers (21).

In 1894, Hoppe-Seyler (22) applied the closed circuit principle of Regnault and Reiset for work on man. In 1903, Jaquet (23) used an open circuit chamber apparatus and analyzed the outgoing air for carbon dioxide and oxygen.

CALORIMETERS

Let us consider calorimetry. Crawford (24) first published his work on animal heat in 1771. Lavoisier and Laplace published in 1780 (25) their experiments on the heat given off by a guinea pig in an ice calorimeter and found that it nearly equalled that which would be produced in the same length of time by the oxidation of the carbon equivalent to the carbon dioxide produced by the guinea pig. This was the first attempt to establish the relationship between direct and indirect calorimetry. Despretz (26) in 1824 received a prize for the best thesis on animal heat. He used a combination of calorimeter and respiration apparatus. In a typical experiment with a guinea pig, the direct and indirect heat agreed within 8 per cent.

One of the earliest forms of calorimeters suitable for men and large animals was devised by Scharling (27) in 1849. The subject was placed in a closed chamber inside a larger room of constant temperature. The rise in temperature of the inner chamber was noted, and the heat emission was calculated.

Since that time there have been a number of air, vapor, and water calorimeters for men and animals. These are mainly of historical interest. Mention should be made of the Ott (28) water calorimeter for men described in 1889, which, however, measured only heat elimination. In 1893, Likhatscheff (29) published his experiments on production of heat by healthy men at rest. He measured the respiratory exchange as well and calculated the oxygen directly. He found that at night the heat production decreased and the respiratory quotient was lowered. These experiments were carried out with great care for all sources of error.

Atwater began the construction of a respiration calorimeter for man in 1892, and in 1899 were published (30) the experiments with man in which the law of conservation of energy was corroborated for man, and direct and indirect calorimetry agreed within a high degree of accuracy. Rubner (31), in 1894, had already demonstrated that it held with the dog.

A respiration calorimeter for adult steers was described by Armsby and Fries in 1903 (32). They used the principle of the calorimeter of Atwater and collaborators, together with the open circuit method for the determination of output of carbon dioxide and water vapor. In 1905, a description of a respiration calorimeter of the closed circuit type was published by Atwater and Benedict (33). With this apparatus it was possible to determine the amounts of protein, fat, and carbohydrate metabolized and to compare the heat values of the nutrients burned directly with the measured heat production.

In 1907 the Nutrition Laboratory was established in Boston, and in 1910 (34) appeared the description of respiration calorimeters for men in which the direct and indirect heat production could be determined in 1-hr. periods.

Williams, in 1912, described (35) a respiration calorimeter for babies and dogs. This apparatus was

subsequently used by Lusk in a long series of experiments on specific dynamic action of the nutrients. In 1915 the respiration calorimeter of the Russell Sage Institute of Pathology was finished (36). With this apparatus DuBois and associates have made numerous studies of normal basal metabolism and metabolism in disease, and more recently an extensive series of investigations on the paths of heat elimination. The most recent respiration calorimeters for men and animals are the emission calorimeters of Benedict (37) based on an entirely different principle than most of the preceding calorimeters. They were extremely sensitive for measurements of slight changes in heat elimination.

BALANCE STUDIES AND FOOD ANALYSES

Most of the preceding studies concern the output of materials and energy. Metabolism, however, has to be supplied by intake of materials and energy. Liebig published his work on the analysis of foods in 1840 (38). He classified foodstuffs into protein, fat, and carbohydrates. He believed that the protein of the food could take the place of protein in the body. Also he believed that muscular work was carried on by the metabolism of protein and that oxygen destroyed carbohydrate and fat. In 1870 he admitted that he was wrong on his theory regarding muscular work and metabolism of protein. Since Liebig's work, numerous publications have appeared year after year that give the proximate composition of foods of all kinds, and today analyses of food are made not only for protein, fat, and carbohydrate and ash but vitamins and mineral constituents as well. Rubner (39) made extensive studies of the calorific values of body constituents, food constituents, and excreta and thus established the foundations for the modern calculations of animal and human calorimetry, including the fuel value of food constituents when they were metabolized.

The first experiment on the balance of materials was made by Boussingault in 1839 (40). His experiment was prophetic of the future evolution of studies of metabolism. He compared the carbon, hydrogen, nitrogen, and oxygen in the fodder of a milch cow with the same items in the milk, urine, and feces and considered that the difference would be available for the products of respiratory exchange. Barral (41) in 1849 applied the same principle to studies of the metabolism of members of his family and arrived at results for total calorie production that were reasonable. A complete respiration experiment with a fasting man in which the metabolism of body constituents was determined was made by Pettenkofer and Voit (42) as early as 1866. They came out with a difference between the oxygen absorbed as calculated and as determined that amounted to 48.4 gm. for a day. This was the beginning of thousands of observations on complete balances of energy and materials in animals and men.

THE "BODY SURFACE" LAW

Over a century ago the concept of the relation of heat production and heat elimination to body surface was advanced. Sarrus and Rameux (43) submitted in 1838 a thesis on the subject to the Academy of Medicine in Paris. Their conceptions regarding body surface and heat loss read much like modern ideas on the subject. Their final memoir was published in 1858 (44).

About ten years after Rameux's earliest papers, Bergmann (45) in 1848 tried to explain the proportionately greater food demands of small animals as compared with those of the larger animals by the general idea that the heat production of animals is related to the body surface. His work was entirely theoretical and comparative. He was the first to use the terms "homeotherm" and "poikilotherm" (46).

The first experimental evidence was brought out by Rubner and Richet almost simultaneously (47) on dogs and rabbits respectively. Because of Rubner's unusual technique, his work has been accorded the greater recognition and the "body surface law" has been generally referred to as "Rubner's law." This law has had profound influence upon conceptions of metabolism and has unquestionably stimulated an immense amount of investigation on the question of uniformity of metabolism of animals and man in general. Although it has had wide acceptance by investigators in metabolism, Benedict (48) early took exception to the idea that the metabolism was related to the body surface. He believed that there were so many factors affecting metabolism, namely: height, weight, age and sex, the amount of active protoplasmic tissue, and the internal stimulus to cellular activity. He also held that metabolism was not related to body surface but was governed by several independent factors. In 1919 Harris and Benedict (49) made a statistical analysis of all of the data of the Nutrition Laboratory and cooperating institutions on the basal metabolism of humans and derived formulas for predicting basal metabolism at all ages in both sexes. Tables derived from these formulas are now widely used, particularly in Europe.

Meanwhile, DuBois and associates had made studies on basal metabolism of normal and diseased subjects. He recognized that the formula of Meeh for body surface was not generally applicable and with D. DuBois (50) devised a formula which used height and weight to calculate body surface. This formula has proved very useful and has been found to give the best measure of body surface of humans that we have. Then, using this formula, Aub and DuBois (51) proposed a tentative set of standards for human males and females. These standards have also found wide acceptance and are in general use today. It should be pointed out that the standards of Harris and Benedict and of Aub and DuBois do not differ widely because, for the most part, they were both based on much the same data.

For animals in general, Brody (52) has summed up numerous investigations in his laboratory and other institutions and has derived a formula for the basal metabolism of animals in general. His formula is that the calories per 24 hr. equals 70.5 times the weight in kilograms raised to 0.734 power of the weight. Benedict (53), however, in a comprehensive treatise on the basal metabolism of animals from the dwarf mouse to the elephant does not accept the idea that any generalization either from body surface or from any power of the weight will predict the basal metabolism of any specific animal or species. He has given a critical discussion of the various factors that determine the basal metabolism.

SUMMARY

In general, there has been discussed in brief the high lights in the history of the developments of metabolism studies with reference to the measurements and findings in the income and outgo of energy and materials. Metabolism studies today are much more concerned with the various factors which play individual roles in the summation of total metabolism. We are now much more interested in the roles of hormones, vitamins, and minerals in the intermediary processes which add up to the total metabolism. We are rapidly increasing our knowledge regarding the ferments and enzymes which bring about the final oxidations involved in the supply and expenditure of energy and materials in the body. We have learned from the studies with the stable and radioactive isotopes that some well established conceptions will have to be changed. We may, therefore, look forward to a better knowledge of processes that give us the total sums of metabolism and realize that the history of studies in metabolism is still being made.

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Food Consumption by School Lunch Program

Of 30 million or so children in the country aged 5 to 17, 6.9 million in 48,000 schools were in the school Lunch Program this year. These children consumed approximately $200 million worth of food this year, most of which the schools themselves purchased locally on the open market. Just imagine what this means from the standpoint of nutrition. It means that school children drank more than 200 million quarts of milk this year. In a single day, 6 million half-pints of milk were consumed in the School Lunch Program—three times as much fluid milk as is used daily in the greater Washington milk marketing area.

If every school in the program served meat on the menu tomorrow to fulfill protein requirements of a Type A lunch, it would take over half a million pounds.

During 1947–48, we bought some concentrated orange juice and distributed it to schools. The children liked it because it dressed up the meal and added some color and appealing flavor. Where it was distributed, children got vitamin C in their diet two or three times a week through orange juice alone, not to mention what they got from tomatoes, cabbage, and other vitamin-C-rich foods.

—Excerpt from a paper by H. C. Albin, read at the Nutrition Institute, Washington, April 1, as published in Nutrition News Letter, July, 1649.

Study of Essential Familial Hypercholesterolemia

Relationship of Diet and Blood Cholesterol Level[1]

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DURING recent years, it has been considered by many that the blood cholesterol level has some effect on the development of atheromatosis. It is thought by Dock (1–3) as well as others (4–7) that the amount of cholesterol in the diet is a factor not only in the production of atheromata, but also in determining the concentration of cholesterol in the blood.

Many have expressed uncertainty (8–11) as to the importance of ingested cholesterol as a controlling factor of the blood level, and also as to its etiologic significance in atherosclerosis.

Some of the assumptions of those favoring a dietary factor in the production of atherosclerosis have been based on the fact that certain races have less atheromatosis than others, and that they also ingest less animal fat and cholesterol. Comparisons of this type are difficult and since so many variables, both known and unknown, are present, conclusions are made with difficulty.

Dietary habits are influenced by many factors, such as: (a) economic status, (b) availability of foods, (c) nationality and religion, (d) dental repair, (e) personal likes and dislikes, (f) age, and probably as important as any (g) the dietary habits of the head of the house.

Essential familial hypercholesterolemia (12) is a metabolic disorder characterized by increased total blood cholesterol and normal percentage of cholesterol esters. The other blood lipids are little affected, with the exception of the phospholipids, which are also increased. This condition is transmitted as an "incomplete" dominant, and the homozygous-abnormal person not only has xanthoma tuberosum, but he is liable to early atheromatosis. The heterozygous-abnormal person has hypercholesterolemia and may, or may not, have xanthelasma, but he does not have xanthoma tuberosum.

[1] Received for publication March 18, 1949.

PROCEDURE

While studying a kindred group in which essential familial hypercholesterolemia (12) was present, an opportunity was afforded us to observe the effect of the dietary composition on the blood cholesterol level. Since this family group was large and cooperative, and, inasmuch as four generations were available, it was ideal to study. The ages varied from less than one year to fifty-nine years. Approximately 80 per cent of these people lived in rural areas. Of ninety-one who kept dietary records, eighty-three were studied with sufficient completeness to be included in this report.

The individual families were chosen where there were members with essential familial hypercholesterolemia, as well as normal individuals. The choice of food was not influenced by economic status. Usually one person—the mother—planned, cooked, and served the meals and kept the dietary records for the entire family. The type and quantity of food used by each individual at each meal was measured and recorded for a period of one or more weeks during the seven months of this study. In each case, a dietitian taught the recorder the technique of keeping food diaries. A careful dietary history was also taken. The members of the group observed were told not to change their eating habits and to record everything that was eaten. The food diaries were then analyzed, and the component parts of the diets were calculated from accepted food tables (13, 14).

We believe that comparisons of individuals studied in this way are inherently superior to broad generalizations where no effort is made to control, or even enumerate, the known variables.

RESULTS

As seen in Figures 1–4, the level of the total blood cholesterol was unrelated to the amounts of carbohydrate, fat, protein, and cholesterol in the diet.

It was felt that a more significant comparison could be made if the percentage of the caloric intake

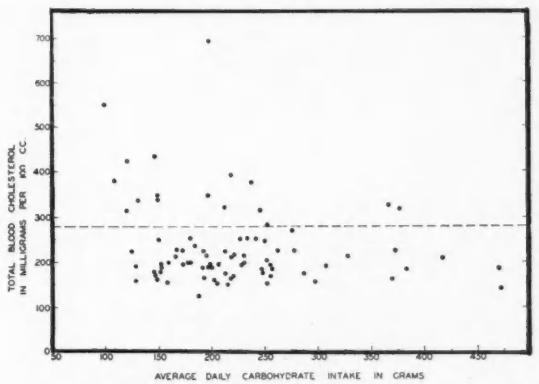

FIG. 1. *Relation between carbohydrate intake and blood cholesterol.*

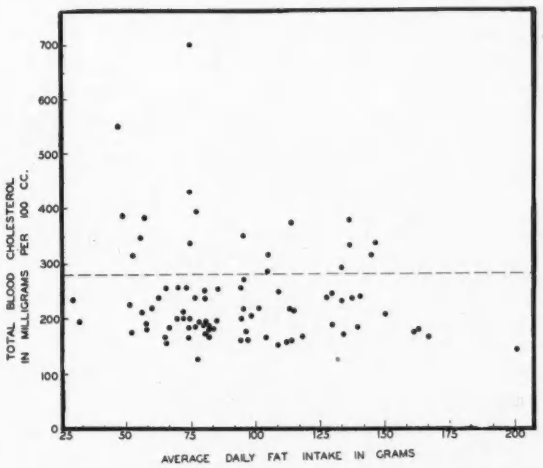

FIG. 2. *Relation between fat intake and blood cholesterol.*

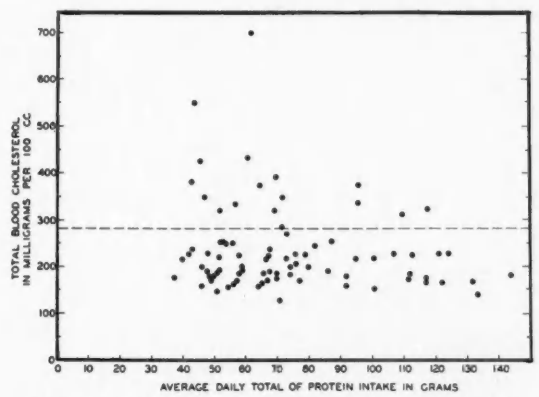

FIG. 3. *Relation between protein intake and blood cholesterol.*

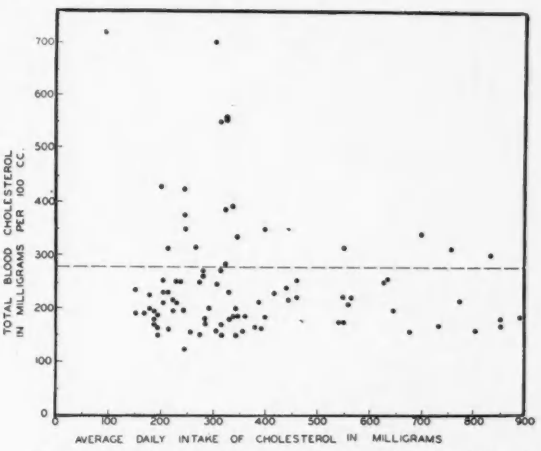

FIG. 4. *Relation of cholesterol intake and blood cholesterol.*

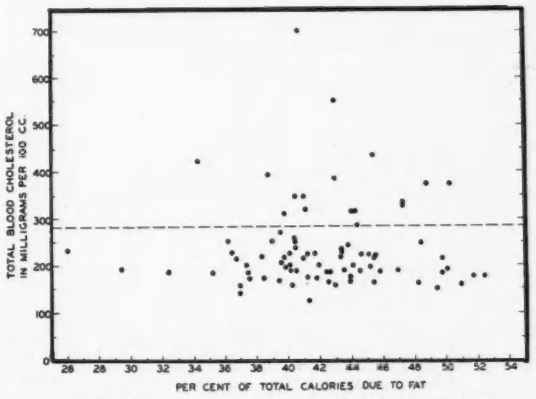

FIG. 5. *Relation of percentage of total caloric intake due to fat and blood cholesterol.*

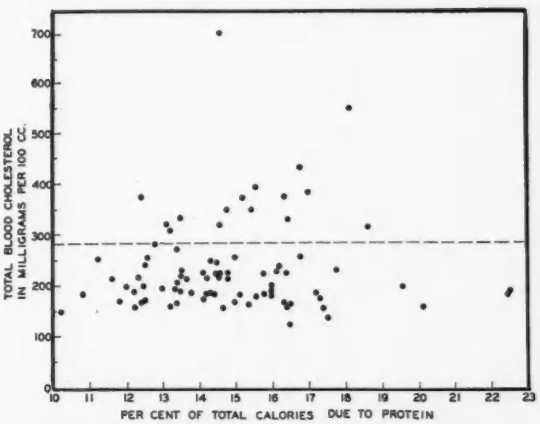

FIG. 6. *Relation of percentage of total caloric intake due to protein and blood cholesterol.*

resulting from each component was used as the variable, rather than the absolute amount. Figures 5–7 show that there was no relation between dietary composition and the total blood cholesterol level.

SUMMARY

(a) Eighty-three individuals eating a diet of choice were studied.

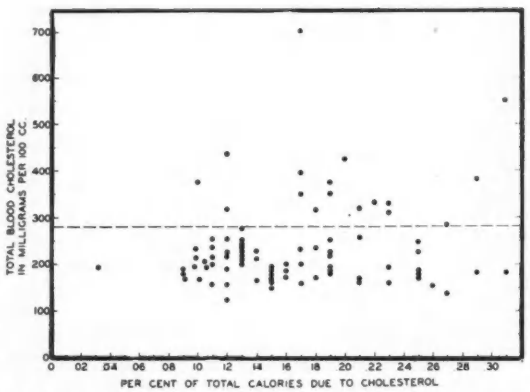

FIG. 7. *Relation of percentage of total caloric intake due to cholesterol and blood cholesterol.*

(b) The absolute amount of carbohydrate, fat, protein, or cholesterol in the diet had no demonstrable relationship to the level of the total blood cholesterol.

(c) The percentage of total calories supplied by the various dietary constituents had no demonstrable relation to the level of the total blood cholesterol.

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Diet in Ulcerative Colitis

The following dietary program has served well in cases of ulcerative colitis. The activity of the disease will determine the phase of the diet on which a patient is placed.

Approximate composition of this diet (actually a variation of 10 per cent in the composition of the diet is assumed) is as follows:

NUTRIENT	UNIT	FOUNDATION DIET	FULL DIET
Carbohydrates	Gm.	195	270
Protein	Gm.	85	145
Fat	Gm.	125	215
Calories	—	2,240	3,600
Calcium	Mg.	470	1,940
Iron	Mg.	11	17
Vitamin A	I.U.	4,300	7,800
Thiamine	Mg.	1.4	2.5
Riboflavin	Mg.	1.5	4.0
Nicotinic acid	Mg.	14	18
Ascorbic acid	Mg.	35	105

The initial or foundation diet is served to patients with chronic ulcerative colitis. At the outset of a well ordered program, it is a diet low in residue. Additions of food are made as tolerated so as to increase the calories and protein as quickly as possible. One additional food as well as increased size of servings is given each day unless otherwise ordered by the physician. Protein concentrates may be used or nonfat milk solids may be added to fruit juices or milk as suggested here. In general the use of tobacco and alcohol is contraindicated in patients with active ulcerative colitis. The question of medicinal therapy is difficult to answer because new drugs are constantly coming into use. Among the sulfonamide compounds the most satisfactory one has been phthalysulfathiazole, 15 to 22½ grains (1 to 1.53 gm.) every 3 hr. These drugs can be given for approximately two weeks at a time for the average patient, and after a rest of a week or so they may be resumed for a similar period of two weeks. Innumerable other drugs are being used, and descriptions of these will be found in current publication.—*From Queries and Minor Notes, J.A.M.A. 138: 857 (November 13), 1948.*

Utilization of Ascorbic Acid

Crystalline Supplement vs. Grapefruit as Source[1]

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IN STUDIES comparing the availability of the ascorbic acid of foods with that of the crystalline substance only the reduced ascorbic acid has usually been taken into account. Although procedures involving use of saturation and depletion periods, type of basal diet with respect to low or adequate ascorbic acid content, and criteria for judging availability have varied, considerable agreement is to be found in the conclusions reached by investigators. In general, they have reported approximately equal human utilization of the crystalline vitamin and that obtained from food sources.

The availability of the ascorbic acid of orange juice has been investigated by Hawley, Stephens, and Anderson (1), of baked potato by Clayton and Folsom (2), of red raspberries by Todhunter and Fatzer (3), of canned tomato juice and raw cabbage by Clayton and Borden (4), of papayas and guava juice by Hartzler (5), and of cooked mustard greens by Hollinger (6). Hollinger, using plasma ascorbic acid levels as the criterion of availability, concluded that some individuals utilize the ascorbic acid from cooked mustard greens as well as the crystalline vitamin, but that others show better utilization of the latter. Einbecker *et al.* (7) compared availability of reduced and total ascorbic acid of frozen strawberries with crystalline ascorbic acid. They found comparable utilization when the crystalline ascorbic acid was fed in amounts equivalent to the reduced ascorbic acid of the strawberries, but greater availability of the crystalline vitamin when fed in amounts equivalent to the total ascorbic acid of the strawberries. They used as their measure of utilization the increase in the plasma ascorbic acid for which they determined only the reduced form.

The authors became interested in the availability of the ascorbic acid of grapefruit because it constitutes an important dietary source of this nutrient. Studies of this kind on grapefruit have not to the knowledge of the authors been reported by other workers, nor have availability studies been encountered in which the 2,4-dinitrophenylhydrazine method for assaying total ascorbic acid was employed for all analyses.

EXPERIMENTAL PROCEDURE

Students enrolled in various divisions of Purdue University, including ten women and two men ranging in age from nineteen to twenty-seven years, served as subjects. Some of the subjects served through repeated studies, one man participating in all but the final study. They were all in a good physical condition as far as could be determined and had presumably been consuming adequate diets.

The experiment consisted of five separate studies, all of which followed the same general plan of procedure. The studies were divided into four periods of three days duration each, except in the last study when the periods were five days long. Thus, the first four studies lasted twelve days, the fifth study for twenty days.

In each study during Period 1, which was a saturation period, the subjects, while consuming their usual diets, were given 200 to 250 mg. ascorbic acid daily in tablet form to bring them to a state of tissue saturation. In Period 2 the subjects received a basal diet of known ascorbic acid content supplemented in four of the studies with 75 mg. pure crystalline ascorbic acid[3] and in one with 40 mg. Period 3 was another saturation period exactly like Period 1. In Period 4 the subjects consumed the basal diet supplemented with grapefruit in an amount estimated to give a quantity of ascorbic acid approximately equivalent to the crystalline ascorbic acid administered in Period 2.

The basal diets were planned so as to be adequate in all of the nutrients except ascorbic acid which was kept low. The same diet was used through four studies, but was modified slightly for the fifth in

[1] This study had the financial support of the Purdue Research Foundation. Received for publication April 30, 1948.

[2] The authors also wish to express their appreciation to the students who served as subjects.

[3] Recognition is due Mead Johnson Company for generous donations of ascorbic acid tablets.

TABLE 1

Composition of basal diet providing 27.1 mg. total ascorbic acid

FOOD	AMOUNT
Egg	50 gm.
Prunes	65 gm.
Oatmeal	100 gm.
Sugar	13 gm.
Cream of pea soup, canned	145 gm.
Milk	410 gm.
Apricots	90 gm.
Ground beef patties	100 gm.
Potatoes, mashed	100 gm.
Corn, canned	70 gm.
Lettuce, shredded	20 gm.
Salad dressing	14 gm.
Cheese	25 gm.
Ice cream	100 gm.
Cookies	20 gm.
Butter	26 gm.
Bread and rolls	*ad libitum*

order to relieve the monotony for those subjects who served a number of times. The first diet averaged 27.1 mg. and the second 20.8 mg. ascorbic acid. The pattern for the first of these basal diets is given in Table 1.

The ascorbic acid supplements were given at breakfast and at noon. A weighed amount of the crystalline vitamin was dissolved in a small amount of glass-redistilled water immediately before ingestion. The grapefruit was peeled closely before sectioning so as to remove all outer membrane, and the membrane between the sections was removed. This was done immediately before serving. Individual servings were weighed out from a mixture of the sectioned grapefruit, and at the same time a representative sample was taken and covered with the acid mixture preparatory to analysis, which was completed as soon as possible.

Daily analyses were made of food and urine for total ascorbic acid using the 2,4-dinitrophenylhydrazine photometric method of Roe *et al.* (8, 9). In addition, blood samples were analyzed at the end of each saturation period in one study (Study 2).

In determining the ascorbic acid content of the diet, only those foods containing ascorbic acid were prepared for analysis. A composite was made of aliquots of the foods, which were weighed out at the time of ingestion and placed in 300 cc. of a solution containing 5 per cent metaphosphoric and 10 per cent glacial acetic acid. The 24-hr. urine samples were collected in liter-size brown glass bottles containing 20 gm. metaphosphoric and 20 cc. glacial acetic acid.

RESULTS AND DISCUSSION

The findings are summarized in Table 2. The availability has been expressed in terms of the percentage of ascorbic acid intake not excreted in the urine and, therefore, assumed to be retained in the

TABLE 2

Comparison of availability of ascorbic acid from grapefruit and from crystalline supplement

STUDY*	NUMBER OF SUBJECTS	ASCORBIC ACID			
		Average daily excretion		Average retention	
		Crystalline supplement	Grapefruit	Crystalline supplement	Grapefruit
		mg.	*mg.*	%	%
1†	4	61.0	18.8	46.7	77.6
2‡	2	53.9	51.3	46.1	54.3
3‡	4	61.1	54.2	40.9	38.2
4§	5	26.9	30.4	54.5	57.6
5‡	4	31.8	38.0	67.8	62.5
Average		46.9	38.5	51.2	58.0

* First four studies consisted of four periods of three days each. In Study 5, there were four five-day periods. Periods 1 and 3 in all studies were saturation periods; during Period 2, source of ascorbic acid was crystalline supplement; in Period 4, ascorbic acid was obtained from grapefruit.

† Intake from crystalline ascorbic acid, 75 mg.; from grapefruit, 40 to 50 mg.

‡ Intake from crystalline ascorbic acid, 75 mg.; from grapefruit, approximately the same.

§ Intake from crystalline ascorbic acid, 40 mg.; from grapefruit, approximately the same.

body. The results for the first day of supplementation were not included in the averages since the excretion of ascorbic acid for that day was usually considerably higher than on subsequent days, due to the influence of the saturation dose which immediately preceded. It will be noted that in the first study there was a markedly higher retention of the ascorbic acid of the grapefruit than of the vitamin in the crystalline form. However, the later studies contradicted this finding in that they indicated approximately equal availability of the vitamin in the two forms. The latter is in agreement with earlier reports on availability of ascorbic acid in foods.

It was thought that the results obtained in the first study might be attributed to the fact that the intake of ascorbic acid on the grapefruit supplement was considerably lower than on the crystalline ascorbic acid supplement. Although the amount of grapefruit consumed was estimated to furnish a quantity of ascorbic acid approximately equal to the 75 mg. administered in the crystalline form, analysis showed that the grapefruit supplements contained only 40.6 to 50 mg. Larger amounts of grapefruit were given in Studies 2, 3, and 5, but in Study 4 the crystalline ascorbic acid was reduced to 40 mg., with the grapefruit furnishing approximately the same amount. Since lowering the intake in the latter study did not result in the very high retention observed in Study 1 for the grapefruit, it was concluded that the apparently better utilization of the ascorbic

acid of the grapefruit could not be explained on the basis of lower intake.

Extending the length of the supplementation periods from three to five days in the last study did not appear to materially influence the results. The average retentions were somewhat higher in this study, but this was not due to any consistent decrease in output after the third day. However, since subjects on constant intake frequently showed considerable day-to-day variation in the amount of ascorbic acid excreted, longer periods would seem to be advantageous in arriving at average retentions.

In all of the studies, marked differences in the excretion of ascorbic acid occurred among the different subjects and the excretion of subjects participating more than once varied from study to study with little or no variation in intake.

The ascorbic acid blood levels obtained during Study 2 indicated tissue saturation on both the crystalline ascorbic acid and grapefruit supplements. The values for each of the three subjects for the respective periods were 1.06, 1.46, 1.16 mg. and 1.10, 1.47, 1.19 mg. per 100 cc. of blood.

SUMMARY

An investigation was made of the availability of ascorbic acid of grapefruit as compared with that of pure crystalline ascorbic acid, using twelve Purdue University students, ten women and two men, as subjects.

Availability has been expressed in terms of the ascorbic intake not excreted in the urine, and, therefore, assumed to be available for use in the body.

Analyses were made for total ascorbic acid using the 2,4-dinitrophenylhydrazine method, whereas most earlier availability studies have considered reduced ascorbic acid only.

In four of the five studies, the results indicated approximately equal utilization of the ascorbic acid from the two sources.

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Preventing Brucellosis

The control and eventual eradication of brucellosis is dependent on available epidemiologic knowledge of the disease. The reservior of brucellosis is in domestic animals, especially cattle, hogs and goats. The disease is not transmitted from human being to human being except under extremely rare conditions, such as the establishment of an infection *in utero* or the transmission of Brucella to a missing infant through the milk of an infected mother. Brucella organisms are shed in the milk of infected cattle and goats, and, therefore, the disease is contracted by human beings through the ingestion of raw milk or products of milk such as cheese and butter prepared from unpasteurized milk. One method of controlling the disease in human beings, then, is to have all milk pasteurized for human consumption. A second method of contracting the disease is through dermal contact with infected material such as animal tissues, secretions, and excretions. In this manner, the disease is occupational and may affect farmers, livestock producers, meat-packing plant employees, and veterinarians. There are no practical procedures for preventing brucellosis in human beings under these conditions except by eradicating the disease at its source. The disease can be eliminated in cattle by vaccination of calves and by eradicating from a herd animals which have positive agglutination reactions. The eradication of brucellosis in swine poses a more difficult problem in that the blood test is not so reliable in this species. Brucellosis in goats constitutes a problem in some sections of the country, particularly the southwestern states.—*From Queries and Minor Notes., J. A. M. A. 140: 1192 (August 6) 1949.*

Comparison of Meat and Legumes in a Controlled Feeding Program

IV. Second Period with Regimens Reversed—Dietaries and Results of Physical Observations[1]

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MACK, Shevock, and Tomassetti (1) in three installments of this series have reported on the relative value of meat and of legumes in the feeding of growing children as studied during a fourteen-month period in two orphanages in central Pennsylvania.

During the fourteen months covered by the former reports, the dietaries were planned so that the children under ten years of age in Institution I, would receive meat twice weekly, to the extent of 75 gm. meat and liver (in the ratio of nine to one) and 75 gm. poultry or fish, making a total of 150 gm. meat, poultry, and fish weekly. Children ten years of age and over received 100 gm. per week of the two categories, or a total of 200 gm. meat, poultry, and fish weekly, including approximately 10 gm. liver usually incorporated in a stew or meat loaf.

The menus for the second orphanage, designated as Institution II, included meat, poultry, or fish ten times weekly, with the following distribution: meat and liver (in the ratio of nine to one) to the extent of 675 gm. for the younger and 900 gm. for the older age group; and poultry or fish to the extent of 75 and 100 gm. for the two respective age groups.

The dietaries of Institution I provided main dishes of dried legumes, supplemented by macaroni, spaghetti, peanuts, and peanut butter in amounts sufficient—with the aid of additional leafy green vegetables—to bring the caloric value, as well as the nutritive content of the dietary of this orphanage on a calculation basis to the level of that of Institution II, which had the higher meat intake. The "Master Plan" for the two orphanages met or exceeded the recommended allowances of the National Research Council, Food and Nutrition Board (2) in all respects, and the higher vitamin A recommendations of Munsell (3). It met the recommendations of Stiebeling and Phipard (4) for phosphorus, this value being used because of the absence of a phosphorus recommendation by the National Research Council when the study was planned.

During the second fourteen months of the study—the period covered by this report—the food regimens were reversed. Institution I was placed on the higher meat and liver intake program and Institution II on the lower.

During the first fourteen-month study the children in the two groups were taken to a nutrition laboratory for tests and observations initially, after eight months, and after a subsequent six months. During the second fourteen-month period, the tests were given after seven and after fourteen months. Throughout the entire twenty-eight months, therefore, observations and tests were made on the children initially, and at the close of eight, fourteen, twenty-one, and twenty-eight months.

A second group of new arrivals in each of the two orphanages was observed on the two types of dietaries over a seven-month period concurrently with the observations on the larger groups covered in this report.

In this paper are reported the findings concerning

[1] This is one of a series of reports on nutrition studies of institutionalized children conducted by the Ellen H. Richards Institute under the auspices of the Department of Health, Commonwealth of Pennsylvania. The study was assisted by a grant-in-aid from the National Live Stock and Meat Board. Received for publication April 4, 1949.

[2] The author is deeply indebted to all staff members concerned with nutrition of the Ellen H. Richards Institute for invaluable help in conducting the study covered by this report, particularly to Maloise Sturdevant Dixon, Mary Baur, Elizabeth Ammerman, Katherine Fisher, Elizabeth Allie, Alma Bonney, Jack Crissman, Madge Zimmers, George P. Vose, Walter N. Brown, Jr., Ruth Brooks, Jeannette Burleigh, Ethel M. Honess and co-workers, and James D. Lemley and co-workers.

the dietaries and the physical findings on the children during the second fourteen-month study. In Part V will be reported the blood, urine, and functional data, and in Part VI data will be given concerning new children in the respective institutions who were fed under the respective regimes for seven months.

EXPERIMENTAL PROCEDURE

Subjects

In the two groups of experimental subjects used in the study, there initially were seventy-four children in Institution I and seventy in Institution II. By the end of the first fourteen-month period, sixty-one of the original children remained in Institution I and forty-one in Institution II. The first series of reports covering this period (1) was based only on the children in the respective orphanages who continued throughout the three laboratory observations and tests.

At the beginning of the second fourteen-month study, twenty-seven children were added to the experimental group in Institution I and thirteen in Institution II, who were not included in the data of the first period. All of these children had entered the respective orphanges after the first set of tests of the first fourteen-month series had been given, but at least six months before the beginning of the second fourteen-month study and had partaken of the same dietary as the original experimental children. At the beginning of this second period, their medical, dental, and nutritional data were not materially different from those of the children who had resided in the respective orphanages for the full fourteen previous months. The proportions of children under ten years of age and ten years of age and over in the two institutions were the same during the first and second fourteen-month periods. The data for the second fourteen-month study were based on the children who received all three sets of tests for that period. In the figures, Test III includes the final averages for the children taking all three tests during the first period of study, and Test IIIA includes the first averages of those who completed the second period.

In all, seventy-eight children qualified in Institution I for this second period of study, either by being in the institutions from the beginning or by entering within the period specified; forty remained in Institution II until the close of this second experimental period.

The ages of the children ranged from six to fifteen years, with a similar sex-age distribution in both institutions.

Dietaries

The Master Plan for the two sets of dietaries; the initial dietaries in the orphanages before they were chosen for the investigation; and the conformity of the experimental dietaries during the first fourteen months, both to the Master Plan and to the National Research Council recommendations, have been given in detail (1).

In Table 1 are compared the calculated Master Plan and the average intakes of two age groups of children in the two institutions during the second fourteen-month period, with the dietaries interchanged between the orphanages. In this table, the calculations of the Master Plan were based on averages for calories and the designated nutrients as recommended for each specific child according to his age group. The values for *actual intake* are the daily averages of the amounts of food consumed by the respective groups of children throughout the study.

In Table 2 is given a broad comparison of the animal or vegetable sources of such nutrients as protein, iron, vitamin A, thiamine, and other B vitamins in Institution I (now on the higher meat intake) and Institution II (now on the lower meat intake).

The dietaries over the fourteen-month period were in close conformity with the Master Plan in most respects, and they were very similar to each other on a calculation basis. The intake of protein exceeded the Master Plan in both institutions, but both values were almost identical for the comparable age groups. Intake of ascorbic acid was somewhat lower by both groups than that provided in the Master Plan. Intake of energy and of all nutrients for which calculations currently are made was as high as or higher than the Recommended Dietary Allowances (2) on a sex-age basis.

The children consumed more food than during the first fourteen months of the study. Before the investigation began, they had been receiving less total food in both institutions than required to meet the National Research Council recommendations. As was discussed in the previous reports, time was required for appetite adjustments. Moreover, although the age composition was approximately the same (with the replacements) during the two periods, growth had been stimulated. Hence, the children were somewhat larger for their ages than originally.

The respective amounts of certain of the nutrients obtained from animal and vegetable sources are shown in Table 2. The differences comply with the fact that meat was higher in the dietary of Institution I, whereas legumes and related products were higher in that of Institution II. No

TABLE 1

Comparison of calculations of the master plan with those of the actual daily average intakes for children in the two institutions

ENERGY SOURCE AND NUTRIENTS	INSTITUTION I				INSTITUTION II			
	Dietary of children under 10 years of age		Dietary of children 10 years of age and over		Dietary of children under 10 years of age		Dietary of children 10 years of age and over	
	Master plan	Average actual intake	Master plan	Average actual intake	Master plan	Average actual intake	Master plan	Average actual intake
Calories	2,180	1,954	2,796	2,687	2,108	1,967	2,750	2,654
Protein (gm.)	68.2	75.3	82.6	97.9	67.0	76.8	83.0	98.4
Calcium (gm.)	1.15	1.15	1.34	1.36	1.10	1.14	1.29	1.38
Phosphorus (gm.)	1.41	1.33	1.68	1.67	1.32	1.35	1.65	1.72
Iron (mg.)	14.30	13.97	17.85	16.93	14.10	13.93	18.70	16.87
Vitamin A (I.U.)	10,157	9,116	11,793	10,854	10,080	9,598	12,267	10,428
Thiamine (mg.)	1.734	1.628	2.213	1.988	1.762	1.857	2.335	2.353
Riboflavin (mg.)	2.829	2.704	3.321	2.885	2.830	2.745	3.390	2.825
Niacin (mg.)	12.97	12.60	16.00	15.32	11.03	12.53	14.50	15.67
Ascorbic acid (mg.)	116	85	157	107	100	96	158	124

soybeans were used in this period as was the case during the first fourteen months.

The close comparisons in the total intake of such nutrients as protein, iron, vitamin A, and the B vitamins, by comparable age groups in the two orphanages (on a calculation basis) were striking, even though animal foods provided a preponderance of these components in the one group, and vegetable foods in the other.

TABLE 2

Calculated daily intakes of the experimental institutional dietaries

ENERGY SOURCE AND NUTRIENTS	INSTITUTION I (Meat 10 times weekly)		INSTITUTION II (Meat 2 times weekly)	
	Dietary of children under 10 years of age	Dietary of children 10 years of age and over	Dietary of children under 10 years of age	Dietary of children 10 years of age and over
Calories	1,954	2,687	1,967	2,654
Protein (gm.)				
From meat	23.6	32.8	5.2	6.2
From other animal sources	30.2	37.4	30.6	31.7
Total from animal sources	53.8	70.2	35.8	37.9
From vegetable sources	21.5	27.7	41.0	60.5
Total	75.3	97.9	76.8	98.4
Calcium (gm.)	1.15	1.36	1.14	1.38
Phosphorus (gm.)	1.33	1.67	1.35	1.72
Iron (mg.)				
From meat	4.96	5.63	0.92	1.34
From other animal sources	2.60	2.87	2.57	2.75
Total from animal sources	7.56	8.50	3.49	4.09
From vegetable sources	6.41	8.43	10.44	12.78
Total	13.97	16.93	13.93	16.87
Vitamin A (I.U.)				
From animal sources	5,984	7,054	2,982	3,178
From vegetable sources	3,132	3,800	6,616	7,250
Total	9,116	10,854	9,598	10,428
Thiamine (mg.)				
From meat	0.606	0.846	0.145	0.218
From other animal sources	0.382	0.415	0.369	0.409
Total from animal sources	0.988	1.261	0.514	0.627
From vegetable sources	0.640	0.727	1.343	1.726
Total	1.628	1.988	1.857	2.353
Riboflavin (mg.)				
From meat	0.502	0.600	0.118	0.124
From other animal sources	1.406	1.482	1.397	1.449
Total from animal sources	1.908	2.082	1.515	1.573
From vegetable sources	0.796	0.803	1.230	1.252
Total	2.704	2.885	2.745	2.825
Niacin (mg.)				
From meat	5.27	6.66	1.48	1.79
From other animal sources	0.75	0.92	0.78	0.98
Total from animal sources	6.02	7.58	2.26	2.77
From vegetable sources	6.58	7.74	10.27	12.90
Total	12.60	15.32	12.53	15.67
Ascorbic acid (mg.)	85	107	96	124
Vitamin D (I.U.)*	60	75	40	45

* Daily average intakes from food. Supplements supplying 600 I.U. were given to each child for approximately four winter months.

Medical, Dental, and Laboratory Observations and Tests

The same medical, dental, and laboratory observations and tests given during the first phase of the study were made in the second fourteen months at three periods for the longer-term children and at two for those listed as new subjects. These tests were described in detail previously (1).

FINDINGS

In Table 3 is given a summary of the observations on the physical body for this second fourteen months, including the findings of the pediatrician and the dental examiner; the data from the biomicroscopic examinations; the skeletal data; and the observations on growth.

Medical Observations on Physical Status

Eyes. Whereas 9.8 per cent of the children in Institution I and 6.8 in Institution II exhibited an infection of the conjunctiva, and 6.6 and 3.4 per cent, in the respective groups, showed an infection of the sclera at the beginning of the first fourteen-month period, only two children (2.6 per cent)—both replacements of children who had left the orphanages—showed any eye infection at the beginning of the second fourteen-month study. In both periods, all such infections were removed by the end of the study.

According to the biomicroscope, there was a very slight increase in both institutions in the percentage of areas of the conjunctiva examined routinely (twelve areas in each eye of each subject) which were found to be chiefly transparent, and a considerable decrease in the percentage of areas exhibiting opacity or marked translucency. This change was approximately of the same order of magnitude in both institutions throughout both fourteen-month periods and was similar for the two institutions regardless of the regimen current in each (Table 3).

Mouth. In the histological slides upon which were mounted epithelial tissues from the oral cavity near some of the salivary glands, the children in Institution I (on the higher meat intake) improved markedly during the second fourteen months according to the arbitrary rating given to the stained smears, whereas those in Institution II became steadily poorer. During the previous phase of the study, subjects in Institution I (then on the low-meat regimen) first showed some improvement and then ratings decreased, whereas ratings for the children in Institution II (then on the higher meat intake) consistently improved.

In Figure 1 are shown graphically the average classes given to the epithelial cells from the oral cavity during twenty-eight months covering both phases of this investigation. It should be remembered in viewing this and subsequent figures that, during the first fourteen months of the study, the dietaries in both orphanages were greatly improved and that they were essentially the same on a calculation basis except for the level of meat (including liver). Improvement in physical status in both groups, therefore, was to have been expected, with a possible difference in the level of improvement. During the second fourteen months, the level of energy and of the major nutrients remained practically the same, with the levels of intake of meat and liver reversed in the two institutions.

The figure reveals what Table 1 also has shown with respect to the condition of epithelial tissues—namely, that, after the first improvement in both groups following the introduction of better dietaries, the ratings fell or rose with the level of intake of meat including liver.

The medical examinations of the *tongue* during the first fourteen months showed improvement in both institutions, with results in Institution II on the higher meat and liver intake surpassing the improvement in Institution I in certain respects. At the beginning of this second period, therefore, the tongues were described by the pediatrician as generally in a better condition than at the beginning of the first period. Children in the two institutions were similar in their test results at the last two test periods except that the percentage of those exhibiting proliferation of the filiform increased from zero to 1.3 per cent in Institution I and from 2.5 to 10.0 per cent in Institution II, with proliferation of the fungiform increasing from zero to 8.9 in the first and from 2.5 to

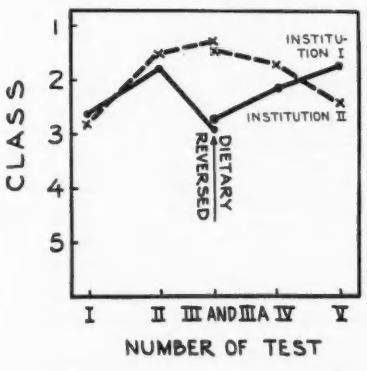

FIG. 1. *Average rating of epithelial cells from oral cavity.*

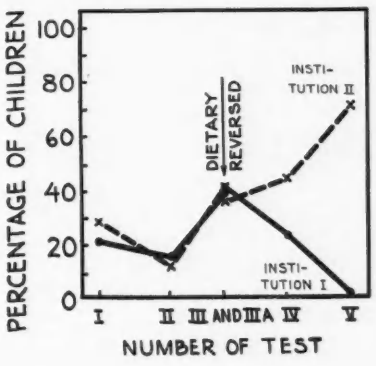

FIG. 2. *Moderate or marked tongue lesions shown by biomicroscopic examinations.*

TABLE 3

Summary of medical and dental observations on body status

MEDICAL AND DENTAL OBSERVATIONS ON BODY STATUS	INCIDENCE OF FINDINGS IN INSTITUTION I (Meat 10 times weekly)			INCIDENCE OF FINDINGS IN INSTITUTION II (Meat 2 times weekly)		
	Test IIIA	Test IV	Test V	Test IIIA	Test IV	Test V
EYES						
Adverse findings from gross examination; percentage of children exhibiting						
Infection of conjunctiva	2.6	0.0	0.0	0.0	0.0	0.0
Infection of sclera	0.0	0.0	0.0	0.0	0.0	0.0
Adverse findings from biomicroscopic examination						
Xerosis of the conjunctiva; percentage of examined areas exhibiting						
Transparency	0.7	1.2	1.5	0.4	0.2	1.8
Translucency						
Slight	5.1	8.9	9.8	3.9	6.8	12.4
Intermediate	25.6	46.7	49.1	26.9	44.5	50.2
Marked	54.0	40.8	35.2	53.1	43.9	33.3
Opacity	14.6	2.4	4.4	15.7	4.7	2.3
Corneal vascularization*	—	—	—	—	—	—
MOUTH						
Epithelial cells from base of buccal salivary glands as shown by histological slides; average class	2.7	2.3	1.8	1.5	1.7	1.8
Tongue						
Adverse findings from gross examination; percentage of children exhibiting						
Filiform						
Atrophy						
Slight	15.4	0.0	1.3	2.5	0.0	2.5
Moderate	0.0	0.0	0.0	0.0	0.0	0.0
Marked	0.0	0.0	0.0	0.0	0.0	0.0
Proliferation						
Slight	0.0	0.0	1.3	0.0	0.0	10.0
Moderate	0.0	0.0	0.0	0.0	0.0	0.0
Marked	0.0	0.0	0.0	0.0	0.0	0.0
Hyperemia						
Slight	0.0	0.0	0.0	0.0	0.0	2.5
Moderate	0.0	0.0	0.0	0.0	0.0	0.0
Marked	0.0	0.0	0.0	0.0	0.0	0.0
Fungiform						
Atrophy						
Slight	11.6	0.0	1.3	2.5	0.0	0.0
Moderate	0.0	0.0	0.0	0.0	0.0	0.0
Marked	0.0	0.0	0.0	0.0	0.0	0.0
Proliferation						
Slight	1.3	0.0	8.9	2.5	2.5	22.5
Moderate	2.6	0.0	0.0	0.0	0.0	0.0
Marked	0.0	0.0	0.0	0.0	0.0	0.0
Hyperemia						
Slight	15.4	12.8	11.6	17.5	12.5	12.5
Moderate	11.6	5.2	0.0	10.0	5.0	5.0
Marked	0.0	0.0	0.0	0.0	0.0	0.0
Entire tongue						
Fissuring	15.4	7.7	8.9	10.0	10.0	12.5
Hyperemia	11.6	12.8	5.1	7.5	10.0	10.5
Dryness	0.0	0.0	1.3	0.0	5.0	5.0
Denuded areas	1.3	1.3	0.0	0.0	0.0	2.5
Acute lingual lesions as shown by biomicroscopic examination; percentage of children exhibiting						
None (Class 1)	1.3	2.6	21.8	0.0	0.0	0.0
Slight (Class 2)	59.0	73.0	78.2	62.5	56.4	30.0
Moderate (Class 3)	38.5	23.1	0.0	30.0	43.6	70.0
Marked (Class 4)	0.0	1.3	0.0	7.5	0.0	0.0
Very marked (Class 5)	1.3	0.0	0.0	0.0	0.0	0.0
Gingiva						
Adverse findings from gross examination; percentage of children exhibiting						
Inflammation	15.4	10.3	17.9	22.5	2.5	2.5
Recession	3.9	3.9	3.9	0.0	5.0	5.0
Acute lesions as shown by biomicroscopic examination; percentage of children exhibiting						
None (Class 1)	3.8	60.3	76.9	10.0	30.8	87.5
Slight (Class 2)	62.9	26.8	23.1	35.0	46.2	12.5
Moderate (Class 3)	25.6	7.7	0.0	35.0	15.4	0.0
Marked (Class 4)	6.4	2.6	0.0	20.0	7.6	0.0
Very marked (Class 5)	1.3	2.6	0.0	0.0	0.0	0.0
Pharynx						
Adverse findings from gross examination; percentage of children exhibiting	0.0	0.0	0.0	0.0	0.0	0.0

* Few cases in either institution exhibited penetration beyond the limbus at any test period.

TABLE 3
Continued

MEDICAL AND DENTAL OBSERVATIONS ON BODY STATUS	INCIDENCE OF FINDINGS IN INSTITUTION I (Meat 10 times weekly)			INCIDENCE OF FINDINGS IN INSTITUTION II (Meat 2 times weekly)		
	Test IIIA	Test IV	Test V	Test IIIA	Test IV	Test V
NOSE						
Adverse findings from gross examination; percentage of children exhibiting						
Slight discharge (not a common cold)	24.4	0.0	0.0	2.5	5.0	5.0
Presence of cerumen	10.3	0.0	0.0	0.0	0.0	0.0
EARS						
Adverse findings from gross examination; percentage of children exhibiting						
Discharge	10.3	10.3	0.0	0.0	0.0	0.0
Presence of cerumen	8.9	8.9	0.0	2.5	37.5	22.5
GLANDS						
Cervical						
Adverse findings from gross examination; percentage of children exhibiting						
Palpable anterior	3.8	10.3	3.8	0.0	12.5	2.5
Enlarged anterior	39.8	1.3	28.3	2.5	27.5	37.5
Palpable posterior	0.0	2.6	1.3	0.0	10.0	7.5
Enlarged posterior	10.3	2.6	2.6	0.0	15.0	15.0
Isthmus of the thyroid						
Adverse findings from gross examination; percentage of children exhibiting						
Palpable	1.3	0.0	0.0	0.0	0.0	0.0
Enlarged	3.8	1.3	1.3	0.0	0.0	0.0
SKIN						
Adverse findings from gross examination; percentage of children exhibiting						
Papular roughness						
Slight	37.1	14.1	14.1	12.5	37.5	32.5
Moderate	12.8	10.3	3.6	10.0	5.0	7.5
Marked	8.9	1.3	0.0	2.5	5.0	5.0
Acne or eczema	7.6	2.6	0.0	5.0	7.5	2.5
Adverse findings from biomicroscopic examination; percentage of children exhibiting						
Dryness						
None	24.4	46.2	52.6	27.5	32.5	32.5
Slight	42.3	44.9	41.0	37.5	45.0	52.5
Intermediate	32.0	8.9	5.1	22.5	22.5	10.0
Severe	1.3	0.0	1.3	12.5	0.0	5.0
Thickening						
None	26.9	57.7	60.2	35.0	22.5	22.5
Slight	46.2	33.3	32.1	32.5	40.0	47.5
Intermediate	25.6	8.9	6.4	27.5	37.5	30.0
Severe	1.3	0.0	0.0	7.5	5.0	5.0
Follicular hyperkeratosis						
None	34.6	91.0	94.9	55.0	70.0	70.0
Slight	47.4	7.7	5.1	22.5	17.5	12.5
Intermediate	16.7	1.3	0.0	15.0	7.5	12.5
Severe	1.3	0.0	0.0	7.5	5.0	5.0
Follicular hyperkeratosis with black spines						
None	71.8	93.6	96.2	62.5	90.0	90.0
Slight	24.4	5.1	3.8	27.5	10.0	10.0
Intermediate	3.8	1.3	0.0	10.0	0.0	0.0
Severe	0.0	0.0	0.0	0.0	0.0	0.0
Hyperemia						
None	80.7	100.0	100.0	67.5	87.5	87.5
Slight	16.7	0.0	0.0	22.5	7.5	12.5
Intermediate	2.6	0.0	0.0	10.0	2.5	0.0
Severe	0.0	0.0	0.0	0.0	2.5	0.0
WEIGHT STATUS						
Percentage of children of correct weight ±10% for the sex, age, height, iliac width, and chest breadth according to Pryor standards (5, 6)	82.0	79.5	76.9	95.0	85.0	85.0
Percentage of underweight children for the sex, age, height, iliac width, and chest breadth (Pryor standards)	11.5	16.7	23.1	5.0	15.0	20.0
Percentage of children remaining in the same or proceeding to a higher age schedule of development according to the Wetzel Grid (7), Test IIIA to V	—	—	91.1	—	—	87.5
Percentage of children falling to a lower age achedule of development, according to the Wetzel Grid (7), Test IIIA to V	—	—	8.9	—	—	12.5

TABLE 3
Concluded

MEDICAL AND DENTAL OBSERVATIONS ON BODY STATUS	INCIDENCE OF FINDINGS IN INSTITUTION I (Meat 10 times weekly)			INCIDENCE OF FINDINGS IN INSTITUTION II (Meat 2 times weekly)		
	Test IIIA	Test IV	Test V	Test IIIA	Test IV	Test V
SKELETAL STATUS						
Adverse findings from gross examination; percentage of children exhibiting						
Deformities related to past undernutrition						
Chest, such as rachitic rosary, frontal bossing, pigeon breast	87.2	—	—	87.5	—	—
Legs, such as bowed legs and knocked knees	89.2	—	—	97.5	—	—
Findings from X-ray examinations						
Maturity (according to Western Reserve standards [8])						
Class 1	47.4	47.4	51.3	47.4	44.6	50.0
Class 2	6.6	13.1	14.5	5.3	7.9	7.9
Class 3	15.8	6.6	3.9	7.9	13.2	2.6
Class 4	3.9	10.5	11.8	10.5	13.2	10.5
Class 5	26.3	23.4	18.5	28.9	21.1	29.0
Mineralization, average; mineral density in terms of gm. ivory/cc. (according to Mack and Smith [9])	0.6869	0.8227	0.8827	0.8953	0.8953	0.9184
DENTAL STATUS						
Overall rating, including caries and orthodontic evaluations; percentage of children receiving						
10 to 9 points (Class 1)	11.5	15.4	6.4	17.6	15.0	7.5
8 to 7 points (Class 2)	55.3	56.5	79.6	67.4	75.0	80.0
6 to 5 points (Class 3)	30.7	24.3	12.8	8.8	10.0	10.0
4 to 3 points (Class 4)	2.5	3.8	1.2	3.1	0.0	2.5
2 to 1 points (Class 5)	0.0	0.0	0.0	3.1	0.0	0.0
DMF/N value for permanent teeth						
Average	0.214	0.192	0.245	0.190	0.124	0.199
Percentage of children in specific range						
0.05 and below (Class 1)	10.2	16.7	3.8	17.6	37.5	5.0
0.06 to 0.25 (Class 2)	47.4	57.7	59.2	70.5	47.5	75.0
0.26 to 0.45 (Class 3)	36.1	19.2	33.3	8.8	15.0	20.0
0.46 to 0.64 (Class 4)	3.8	6.4	2.5	3.1	0.0	0.0
Above 0.65 (Class 5)	0.0	0.0	1.2	0.0	0.0	0.0
Carious condition of deciduous teeth; percentage of children in Classes 4 and 5	60.1	62.7	60.3	61.8	77.5	62.5

22.5 per cent in the second institution. Fissuring and hyperemia of the entire tongue decreased slightly in Institution I and increased slightly in Institution II.

The biomicroscope showed more distinct differences between the extent of acute lesions of the tongue which developed in Institution II in comparison with Institution I during this period. The percentage of children exhibiting no lingual lesions increased from 1.3 to 21.8 between Test IIIA and V in Institution I (higher meat and liver intake); but no child at any test period in Institution II had a tongue rated as free from acute lesions of a minor or major degree of severity (Table 3).

During the first fourteen months, the experimental groups of children were similar in the biomicroscopic tongue ratings. During the second fourteen months, however, the children of Institution II who switched from the high- to the low-meat dietary increased markedly in the percentage of those with tongue lesions of a moderate or marked character.

Figure 2 summarizes graphically the percentage of children exhibiting moderate and marked acute tongue lesions at each test period over the twenty-eight months of this study.

According to the gross medical examinations of the *gums*, 19.3 per cent of the children in Institution I either showed inflammation or recession of the gums during Test IIIA, and 21.8 per cent showed one or the other or both of these conditions at the time of Test V. A slightly larger percentage (22.5 per cent) in Institution II showed gingival inflammation or recession initially (Test IIIA), but only 7.5 per cent finally.

The biomicroscope failed to agree closely with the visual medical examination; by the use of this instrument, only 3.8 per cent in Institution I and only 10.0 per cent in Institution II failed to show slight, moderate, marked, or very marked gingival lesions at Test IIIA.

At Test V, 23.1 per cent of the children in Institution I had slight gingival lesions found by using the biomicroscope; the remainder (76.9 per cent) showed no inflammation whatever. In Institution II, 12.5 per cent of the children had slight gum lesions, with 87.5 per cent showing none.

Nose. During the first fourteen months of the study, Institution I, initially high in nasal discharges (not a common cold), became still higher, whereas Institution II, also initially high, showed marked improvement.

This condition left Institution I with a high and Institution II with a low incidence of nasal discharge at the beginning of the second experimental period when the dietaries were reversed. During this period, the percentage of children with nasal discharges fell from 24.4 to zero in the first institution (now on the higher meat intake); the percentage in Institution II increased very slightly from 2.5 to 5.0 per cent in this respect.

Ears. When Institution I was on the lower and Institution II on the higher meat regimen, discharges and cerumen in the ears increased from zero to 21.3 per cent of the children in the first orphanage; in the second institution none exhibited ear discharges or cerumen throughout the fourteen months.

When the dietaries were reversed, children with ear discharges or cerumen in Institution I fell from 19.2 per cent to zero, while those in Institution II rose from 2.5 to 22.5 per cent.

Glands. At the beginning of the first fourteen months, Institution I, then on the low-meat regimen, had 43.9 per cent of the children with palpable and 36.1 per cent with enlarged anterior cervical glands. This group also had 63.9 per cent with palpable and 13.2 per cent with enlarged posterior cervical glands, and 13.1 per cent palpable and 3.3 per cent enlarged thyroid glands. Slightly higher percentages of children in Institution II exhibited these respective conditions at the same time.

By the time of Test III, there had been some decrease in the aforementioned palpable or enlarged glands in Institution I, with 3.3 per cent exhibiting palpable and 27.9 per cent enlarged anterior cervical glands; 1.6 per cent showed palpable and 6.6 per cent enlarged posterior cervical glands; and 3.3 and 1.6 per cent had palpable and enlarged thyroid glands, respectively.

In Institution II (then on the higher meat intake) none of the aforementioned glands was regarded as palpable or enlarged by the examining pediatrician except in the case of one child with an enlarged anterior cervical gland.

During the second period, in Institution I (then on the higher meat intake) the percentage of children with palpable or enlarged anterior glands had decreased from 43.6 per cent to 11.6; for palpable or enlarged posterior cervical glands, there was a decrease from 10.3 to 5.2 per cent by the end of seven months (Test IV). Between Test IV and Test V, some of the children in Institution I experienced mumps. At the time of Test V, 28.3 per cent in this institution had enlarged anterior cervical glands believed by the pediatrician to be an aftermath of this contagion. None of the children in Institution II had mumps during the study.

Even with this handicap, the percentage of children in Institution I with swollen and palpable cervical glands decreased markedly during the second fourteen-month period, whereas there was an increase in Institution II from 2.5 per cent to 40.0 per cent of those with palpable or enlarged anterior, and from zero to 25.0 per cent with palpable or enlarged posterior cervical glands between Test IIIA and IV; the cervical glands showed little change during the period from Test IV to Test V.

Although initially 16.4 per cent of the children in Institution I and 87.8 per cent in Institution II had palpable or enlarged thyroid glands, this condition had decreased to 4.9 per cent in Institution I and to zero per cent in Institution II, by the end of the first period; and this was not a problem in the second period.

Skin. In Table 3 and Figure 3 is given a comparison of certain aspects of skin condition in the two institutions during this second phase of the study.

During the first fourteen-month period, the children on the higher meat dietary improved markedly in skin condition, while those on the low-meat-high-legume regimen became markedly poorer, both according to the gross examination of the pediatrician and the biomicroscope. Particularly did a condition defined as follicular hyperkeratosis, formerly designated in these reports as keratinization because of its conformity to a skin involvement described by certain cited investigators, increase in the lower and decrease in the higher meat groups.

During the current period with the dietaries reversed, changes in skin condition in the two institutions were highly favorable to the group with the higher meat intake. Thus the percentage of children with different degrees of papular roughness as seen grossly fell from 58.8 to 17.7 in Institution I, whereas those exhibiting this condition in Institution II increased from 25.0 to 45.0 per cent from Test IIIA to Test V.

In all conditions described routinely by the medical assistant using the biomicroscope in skin examinations, the children on higher meat in Institution I improved more markedly than did those in Institution II—or, they improved whereas those in the second institution became somewhat worse.

Growth and Weight Status

In growth, children in the higher meat group made better progress than the others during the first fourteen-month period, with the same true during the second phase of the study. A smaller percentage of children in both institutions were in the correct weight class for the body size according to the Pryor standards (5, 6) as this period of the study progressed. The reason for this seeming anomaly was the fact that the children were experiencing a considerable surge of growth which placed them in higher height and width classes. Originally, most of the children in both institutions were quite small for their sex and age, as was consistent with their low caloric intake.

The Wetzel Grid (7) records for the children

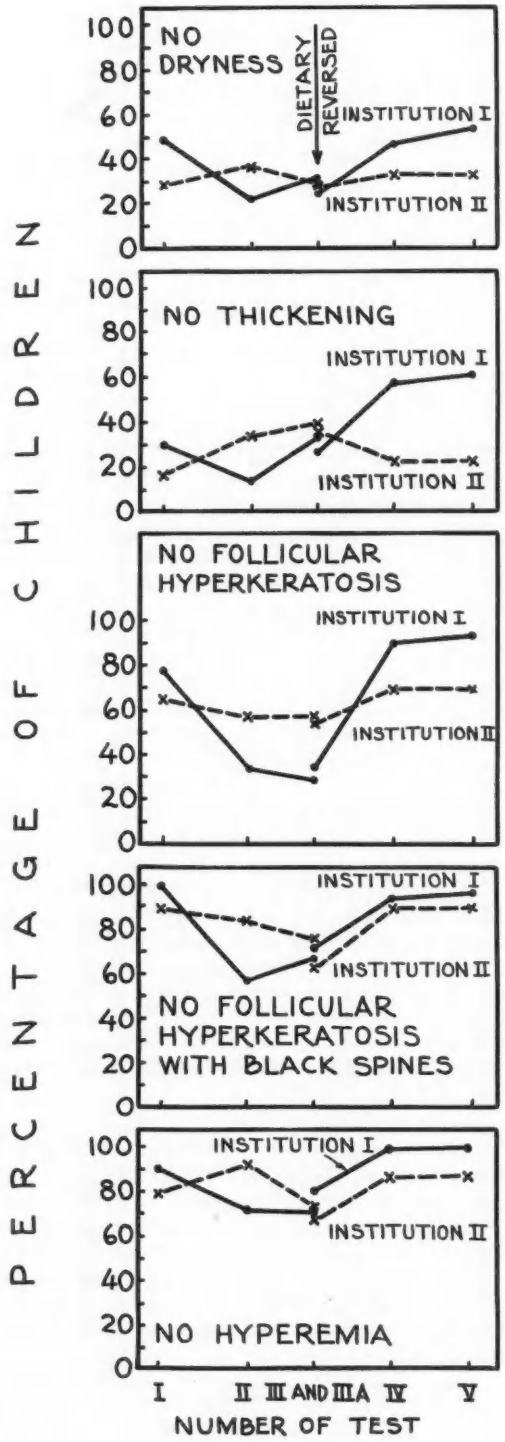

FIG. 4. *Average condition of skin as shown by biomicroscopic examinations.*

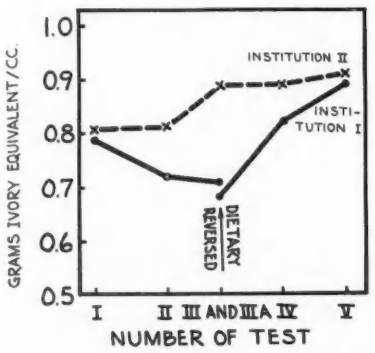

FIG. 3. *Average skeletal mineralization in terms of density.*

showed that 91.1 per cent of those in Institution I and 87.5 per cent in Institution II remained in the same or proceeded to a higher age schedule of development, with 8.9 per cent in the first and 12.5 per cent in the second falling to a lower age development schedule. This slight difference in behalf of Institution I was consistent with the findings of the previous experimental period.

Skeletal Status

In *skeletal maturity*, according to the Western Reserve technique as published by Todd (8), the children in both institutions showed some improvement during the first fourteen months, with the changes not greatly different in the two cases. During the second period with the dietaries reversed, the skeletal maturation progress in comparison with the sex and age of individual children continued, again with no notable difference between the groups (Table 3).

In *skeletal mineralization*, the higher meat group (Institution II) improved steadily during the first fourteen months, while the low-meat group (Institution I) showed lower mineral density by the microphotometric X-ray method of the Ellen H. Richards Institute (9) with each test period.

With the diets reversed, subjects in Institution I (now the group with the higher meat intake) showed consistent increases in skeletal density, while children in Institution II (now on a low-meat-high-legume dietary) just maintained the mineral density per unit volume of bone which they had attained during the first period of higher meat intake. The average skeletal density at each test period is shown graphically in Figure 4.

Dental Observations

Dental status continued to improve somewhat insofar as hygiene was concerned in all groups, with no difference between groups in the trend of the ratings. In the DMF/N values (the sum of the decayed, missing, and filled teeth divided by the number of teeth which have erupted [permanent or deciduous as indicated]), the change in averages as well as arbitrary class distributions tended to become

slightly poorer, as would be expected. The slight seeming inconsistencies in the trends of the DMF/N average values have been explained in a previous paper (1).

SUMMARY

Two groups of institutional children of similarly poor initial nutritional status were fed dietaries over a fourteen-month period which were closely similar except for the fact that one group received meat two and the other ten times weekly. The first group consumed legumes and other vegetable products to an extent which compensated on a calculation basis for the nutritive content of the meat. Both dietaries met specified recommendations, and the low-meat dietary followed a pattern frequently recommended as a low-cost adequate dietary. Liver constituted one-tenth of the meat intake in each dietary.

As reported in three earlier installments of this series, both groups of institutional children showed improvement in many physical tests, which included medical, dental, laboratory, and functional observations. The children on the higher meat dietary, however, were superior in epithelial cell condition; in condition of the skin; in reversal of atrophy of the filiform and fungiform of the tongue; in reduction in enlargement of certain glands; in skeletal mineralization; in age schedule of development (growth) according to the Wetzel Grid; in hemoglobin; in red cell count; in level of blood plasma vitamin A; in certain serum protein fraction relationships; in blood phosphatase; in urinary excretion of thiamine (slightly) and of riboflavin (markedly); in reflexes; in absence of fatigue; and in dark adaptation.

During a second fourteen-month period described in this report, the children in the institution formerly on the low-meat and high-legume intake followed the higher meat dietary and vice versa. The reversal in the dietaries was accompanied by a reversal in certain physical status findings, as follows:

The institutional children on the higher meat intake were superior to the other group in condition of epithelial tissues; condition of the tongue; freedom from nasal discharges (not a common cold); freedom from cerumen in the ears; condition of the cervical glands; condition of the skin; growth; and skeletal mineralization.

Again, the low-meat group was not superior to the higher meat group in any physical respect.

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Availability of Vitamin A

In securing data on the requirement for a dietary essential, some reliable criterion of adequacy is used; also necessary is knowledge of the amount of the substance under investigation which is consumed. In making such a study of the human requirement for vitamin A, Callison and Orent-Keiles estimated the intake of vitamin A activity from raw, quick-frozen, and pressure-cooked carrots, using both the biologic assay with rats and a chemical method whereby the carotene was extracted and measured. The experimental animals utilized the carotene from carrots only about one third as well as they did that from peas, spinach, or an oil solution of carotene. The resulting bio-assay on carrots gave values far smaller than those secured by the chemical method. Recently, the government investigators studied the availability of carotene (vitamin A activity) from carrots and from sweet potatoes as indicated by the comparison of the results of bio-assay with those from chemical determination. Evidently the laboratory rat does not utilize all of the carotene contained in these vegetables; only 34 per cent was obtained from sliced carrot, 41 per cent from carrot purée, and 37 per cent from sweet potato. Naturally, the question of availability of nutrients in plant tissues in human nutrition is raised by the foregoing observations. It would appear advisable to revise the tables of food composition which are widely used by dietitians so that the factor of biologic availability is included in the calculations of requirements. The possible disparity between the quantity of nutrients eaten and the amount absorbed cannot be ignored.—*From Current Comment, J. A. M. A. 140: 1160, (August 6) 1949.*

Audio-Visual Aids for Use by Community Nutritionists[1]

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HELPING people to help themselves is the job of the community nutritionist. This task is almost always more difficult and complex than giving help directly. No doubt that is why so many teachers are tempted to *give* a youngster the answers to his problems.

Your problems range from the protecting of the health of a large family through the improvement of food habits based upon ignorance and poverty, to the subtle attempts to alter the unfavorable relationship between the world food supply and world's population. *Your job is essentially a teaching mission* —a teaching mission indeed, where time is all too short. You are daily attempting, in all the facets of your activities, to modify the behavior of individuals in socially desirable ways. Your problem, then, is one of improving your teaching of people who choose, plan, prepare, and consume foods.

Through family, school, and community agencies you seek to discuss, reason, depict, exhort, experiment, and demonstrate, using a body of knowledge which feels the weight of scientific and philosophic judgments. You may one day make use of data relative to the famines of China and on the next, reveal the implications of the medical findings about rheumatic fever, poliomyelitis, and ulcers. You may utilize data relative to the prevention of rickets, the relation of emotional disturbance to obesity, the nutritional requirements for various types of work, and how to buy food, feed, and maintain the health of an oversize family in an inflated economy.

As one consulting nutritionist put it, "There is so much information. My problem is to 'delimit' the message—to find *the* idea that will bring results." This puts it nicely, indicating the take-off point for our discussion and also emphasizing a common misconception of learning. *Before* good teaching and learning take place, the great body of knowledge, based upon the intimate, purposeful experiences of *others*, is of potential value only. This is to say that basic truths in the experiences of others are valueless, until they are appropriated and personalized by those whom we wish to reach. The art of the teaching mission lies in transplanting the idea, the skill, the attitude, the right appreciation, from the philosophic garden of ideas into the sometimes not so fertile soil of the learner, be he school youngster or adult. Words alone may be futile in building understanding and knowledge without understanding and experience is barren of any effect upon behavior.

Can audio-visual aids serve you in your vital job of transplanting ideas? The answer, based upon all available research, is "yes," but first, you must recognize your own need for help, and then find the solutions to some very definite problems. To feel a real need for audio-visual materials in putting across your ideas is in one sense a strong indication that one's faith in words alone has been shaken. This feeling of need rather than complacency is the starting point for building competence in any field of endeavor. Would that those with whom you deal felt a need! Your teaching mission would then be considerably easier to achieve.

So you want to use audio-visual aids! Well, here are some problems which all of us must face if we hope to be successful.

FORMULATING OBJECTIVES

First, we have the problem of formulating our objectives. If this problem is of great consequence to the master teacher, its solution can hardly be of less value to the community nutritionist.

In deciding upon and formulating our objectives, we must be mindful of a psychologic principle of basic importance, namely, people's actions mirror their ideas—what they know, think, or feel. If you already know which of the nutrition concepts, attitudes, appreciations, and skills people need to develop in order to act wisely in food matters, then your job of selecting and using the right media is simplified. Until we know what these concepts are, we are forced to use the shotgun method of firing a

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mighty broadside, with our eyes partly closed, hoping for a miraculous bullseye. Ideas are the warp and woof of action. The nutritionist mentioned above who said, "There is so much information," has faced this problem.

I believe an important principle should be stated here. I state it boldly and I urge you to give it the attention it deserves. *Audio-visual aids are of value to the degree that valid objectives for their use have been formulated.* Such objectives, stated as understandings, attitudes, and skills, will certainly give the teaching mission of the community nutritionist the necessary purposefulness, direction, and unity. *The Guidance of Learning Activities* by Burton (1) may prove to be of value in pursuing this important problem. If I were a community nutritionist, I should try to plan in advance what desperately needs to be accomplished in terms of ideas. In sports, a fundamental rule is: "Keep your eye on the ball." In our work we need to follow suit and say to each other: "Keep your eye on the idea."

POSSIBLE ROLE OF AUDIO-VISUAL AIDS

Second, and directly related to the first, we have the problem of recognizing the nature of the contributions which audio-visual aids can make to learning. We need not re-emphasize what learning is. If we have followed through with our answer to the problem just discussed, we know what learning is or is not. In simple terms, our problem here is to know what role a motion picture, a radio program, a chart, a recording, an exhibit, or a filmstrip can play in helping to transplant ideas. If your purpose is to present a body of information in as realistic a manner as possible, we know that good audio-visual aids can do the job better than if verbal methods alone were used. That is, a chart, a motion picture, or an exhibit can compel attention and people not only remember more of what they saw and heard but they remember longer.

But how about getting people to penetrate to basic truth in the information given? (This is a problem in developing understanding.) How about getting people to *want to put these ideas* to work in their daily lives? (This is a problem of developing an attitude or an appreciation.) How about putting to work an idea in a convenient, easy, and natural way? (This is the problem of developing a skill.) Can radio programs, can motion pictures, can exhibits, can filmstrips and slides accomplish these valid individual outcomes? We say simply, "they can help," but the role of the nutritionist as a master teacher now becomes clear. It is a dominant role, with the devices relegated to the role of servant. The sculptor's chisel and hammer play an important part in the colossal achievement when in the hands of the artist. The film and radio are comparable tools in the hands of an artist whose job it is to relate the truths about nutrition to the betterment of humanity. It becomes clear that in the art of transplanting ideas which operate in the lives of people, the teacher, the audio-visual aid, and the learner have important roles to play.

Unless the teacher and the aid can stimulate a reaction in the observer, then, the net result is "no gain." An individual needs to have his mental equilibrium disturbed before he will take action of any sort, mental or physical. I presume that the equilibrium of a hen is disturbed when she wants to cross the road to get on the other side, and in taking the necessary action, a kind of balance is restored. If nature abhors a vacuum, it also can be said that nature abhors imbalance. Films and other aids can present ideas in such a manner that complacency gives way to disturbance, and then constructive action may result in the process of restoring a mental balance. It is this crucial action, mental and/or physical, which develops power to change behavior and meet new situations more effectively. It seems clear that a film cannot do all of this for the nutritionist, but if these limitations are comprehended, steps can be taken to safeguard results.

CHOOSING THE PROPER AID

Now we are ready for the third problem, which is choosing and obtaining the best possible device from among the many available. For your class or meeting, it may be that many of the best aids are those which you yourself can make or have produced. It may be that the picture you wish to use costs too much or is otherwise unavailable. So you decide to make a set of handmade slides using etched glass and colored crayons, or you decide to make a series of colorful charts, large enough to be interpreted by those who are sitting farthest from your platform. Such aids to learning will require that you exercise complete control, not surrendering your audience as is done in the case of a sound motion picture. Your artistic handling of ideas in constructing these aids is of basic importance. What to include, of course, is dependent upon your purposes.

The Still Picture

If you have never constructed your own handmade slides, the 10-cent, "How to Make Handmade Lantern Slides" (2) should be helpful. Still lantern slides are an excellent medium for presenting graphic information and relationships of all kinds. There are rich possibilities for field workers in nutrition to prepare photographic slides in color or in black and white, both on the standard $3\frac{1}{4}$ by 4 in. slide or on the popular 2 by 2 in. variety. Pictorial evidence of ideas, both good and bad, at work may be effective tools in the hands of the nutritionist. While we are on the topic of slides and photography, let us not underestimate the power of an enlarged photographic print properly mounted and displayed. The hungry look in the face of an undernourished and sick child may

actually disturb mental equilibrium to the point of prompting suitable action. So, from filmstrip, slide, or photographic print, it is the inference drawn by an individual (the perception of a personal implication) that will cause him to help himself.

Exhibits

Exhibits and displays planned and constructed for meeting-room use, or set up in the store windows, in corridors, or in booths at fairs, may exert strong pressure for desirable modification of food habits. The art of handling ideas in exhibits is discussed and illustrated in several handbooks, but two references conveniently available are the government pamphlet, "Educational Exhibits—How to Prepare and Use Them" (3) and "Planning Your Exhibit" by Janet Lane and Beatrice Tolleris (4). I recommend these publications for careful study by community nutritionists.

Radio, Recorders, and Recordings

We should turn a keen ear to the various audio-aids to learning. The radio is considered to be one of the so-called mass media. We cannot deny the power of a radio program to influence public opinion, but here again, not only the facts, but the method of portrayal, affect profoundly the reaction of the listener. You see it is too easy to turn the dial. Top quality programs with interest-arousing content are basic to good results.

Wire, tape, or disc recorders offer a new kind of help. They would enable you to record first-hand accounts of your talks with people in the field for subsequent broadcasting over local stations. For personal talks and dramatizations over the air, you will find that producing a record of your talk and making several copies thereof would enable you to broadcast over several stations simultaneously, with the resulting great saving of time and energy. Good recordings are of excellent quality, thus not seriously detracting from the all important personality of the voice. Consult your local radio station personnel, your local public school director of audio-visual education, or your state university or state health department for advice on the making of recordings.

Schools throughout the country are awaking to the values of wider use of radio and radio techniques. It may be that radio dramatizations prepared and presented by school radio guilds or other groups interested in dramatics could be the means of exerting favorable influences upon food habits. Script production, however, presents many problems. I have found that radio station personnel are unusually cooperative when local organizations do their share of the spade work, such as preparing scripts, conducting rehearsals, obtaining music in advance, and so on.

Television presents still other problems, but also new advantages.

Motion Pictures

The contribution of the motion picture during World War II in arousing the public to its obligations and as a tool for the rapid dissemination of realistically portrayed information was mighty indeed. The basic and oft quoted entertainment motion picture research study which is summarized in *Motion Pictures and Youth* by Charters (5) leaves no doubt of the power of the film to modify attitudes, excite the emotions, and promote easy acquisition of information. But, to assume that the motion picture as a mass medium will solve all of your educational problems is to make a serious mistake in judgment.

Several important questions, if answered, may prevent you from making hasty assumptions concerning motion pictures. Here are a few:

(a) Do you know what kind of film you need to do your specific job?

(b) Could you pay for the production of such a film or could you get your theater or school to obtain it?

(c) Could you be sure of reaching the people who most need to be reached?

(d) Can a film be depended upon to do the job alone, or must it have your personal leadership to guide reaction?

Like the number of people who listen regularly to radio, the number of people attending movies is great. Thus, if funds were available to provide adequate productions, much good influence could be exerted upon large numbers of people in short periods of time via theatrical films. Two points should be kept in mind, however: first, millions of movie goers do not, as a rule, buy their tickets to contemplate upon local or world problems; and second, producers of entertainment motion pictures are not generally classified as social reformers.

There are increasing tendencies in the educational world today to recognize the power of the film, not as an information capsule for consumption by the masses, but rather as a potential builder of real understanding, of attitudes, and of appreciations. *As pointed out previously, such films demand the leadership of a master teacher. Such films must be accompanied by rigorous mental action.* Lacking this attempt to penetrate to basic truth through discussion and action, we have but little more than a volatile interest. But, such films must not lack qualities of technical and dramatic excellence. In brief summary, it can be stated that it is the teacher who largely determines the value of the motion picture selected.

One has but to scrutinize any one of a number of non-theatrical motion picture film source books to discover that the many aspects of the field of nutrition are richly represented. We find titles ranging from growing, planning, preparation, storage, and distribution of food to such films as "Seeds of Destiny" and "Vitamin B"; from strictly medical subjects to refrigeration; and from cookery to canning.

Yet, it is only during the past year that Hollywood has entered the educational film production field. Moreover, we are told that the present volume of motion picture production is estimated at only 10 per cent of the expected volume ten years hence.

In summarizing, several general principles should be stated:

(a) The learning aid which you choose should *serve* your purpose not *determine* it.

(b) The aid you choose should be the most life-like and of the best dramatic and technical quality which you can afford.

(c) The content should be suited to the experience level of the audience.

USE OF AUDIO-VISUAL AIDS REQUIRES PREPARATION

Lastly, we must face the problem of adequate preparation for using audio-visual materials. There are essentially two types of audio-visual aids for nutritionists: (a) those which are produced to work by themselves under their own power of appeal and direction, such as an exhibit or display, and a theatrical film or radio program, and (b) those aids which are produced or selected to function under the direct leadership of a teacher.

Insofar as the self-contained aids are concerned, the planning and preparation for use must be carried out prior to production, for once on the screen or on the airways, those who are in charge do not usually have the opportunity for immediate redirection of personal reactions. If such a film or other program lacks sufficient appeal, the result may even be less than zero. That is, individuals may be prompted to work against your motive.

Those aids which will serve the purposes of the nutritionist only as she can artistically guide people towards right thinking need much careful planning and preparation. Briefly, and in an over-simplified way, here are some basic suggestions for procedures, some or all of which should be utilized:

(a) Be sure to make a pre-use examination of films, slides, recordings, or charts to make sure that previously conceived purposes may be served.

(b) Plan on just how to relate the film or other aid to your meeting or class. That is, decide on what you can say to introduce the film, or what incident or story you can tell, or questions to ask, to establish a feeling of readiness or desire on the part of observers to participate.

(c) Formulate a few "follow-up," thought-provoking questions. Every effort must be expended during this pre-use planning to prepare the means to translate the story portrayed by auditory or visual means into continuing thought and modified action. The questions you formulate constitute a critical test of competence in getting ready to use audio-visual aids.

(d) Arrange in advance for all details relative to mechanical equipment so as to eliminate distractions.

It should be abundantly clear that there is danger of delusion when the assumption is made that there is magic in an audio-visual aid. Some have been dismayed over final results of improperly used learning aids. In the last analysis an audio-visual aid is a vehicle which, without a master driver, may go no where in particular.

Here are a few last suggestions for gaining competence in the production and use of all kinds of audio-visual aids. I urge community nutritionists to:

(a) Enroll in audio-visual aids extension courses where available.

(b) Attend audio-visual aids institutes and conventions arranged by state health services, universities, and colleges.

(c) Obtain and give careful consideration to the ever-increasing field of audio-visual aids literature. Several valuable bibliographies are available. If you are interested in such a publication, write for our twenty-five-page bibliography to Audio-Visual Aids Center, University of Connecticut, Storrs, Connecticut.

(d) Community nutritionists should obtain source books of films, filmstrips, and slides and gather information about suitable materials in terms of specific purposes.

(e) Nutritional organizations should exert influence upon training institutions to provide prospective nutritionists with suitable audio-visual experiences.

(f) Nutritionists' groups and their advisors might well meet and together formulate a set of the most pressing production needs to be turned over to producers of audio-visual materials.

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Definition of Sanitation

The National Sanitation Foundation defines sanitation as "A way of life, and a quality of living expressed in the clean farm, the clean business and industry, the clean neighborhood, and the clean community. . . . Sanitation being a way of life must come from within the people and be nourished by knowledge."—*From Institutions, July 1949.*

Practicality of Frozen Turkey Filets, Steaks, and Other Products[1]

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THE development of the Broad-breasted Bronze turkey is a boon to those producers and consumers who desire greater portions of light meat. In this breed there is not only an increased portion of light meat but also an accompanying increase in the general size of the turkey.

These larger birds present a marketing problem, however, for small families cannot utilize economically the large portions of these birds. The average family is tending to serve a smaller number of guests at one meal, and the tradition of turkey on holidays only has limited its use in the home. Institutions, although serving roast turkey over a large part of the year, need a variety of methods for serving it and also methods whereby turkey can be prepared readily for small groups.

Large turkeys often can be produced more economically than small turkeys or mature chickens. Growers prefer to raise heavy turkeys but consumers demand the smaller size portions of meat. Thus the successful use of small portions of the large birds would help to meet the desires of both producer and consumer.

Morris (1) suggested that turkey filets were the most acceptable of the products investigated in a study utilizing portions of turkey. The 4-oz. turkey steak produced by the use of a steak-making machine as described by Beanblossom (2) is said to be meeting with considerable approval and acceptance. Nelson (3) indicated that steaks could be cut successfully from turkey. These steaks were made by cutting an entire cross-section of a frozen bird.

With the increased use of turkey filets and steaks, an investigation of their frozen storage life seemed desirable. Frozen storage of turkey has received little attention in the literature up to this time. Asmundson and co-workers (4) indicated that an off-flavor and odor in turkey were quite noticeable when the birds were fed 2 to 5 per cent fish oil. The intensity of the fishy flavor was increased after twenty-two days in frozen storage. In the work on frozen poultry storage reported by Schreiber *et al.* (5), it was found that feeding fish oil or alfalfa for one or two weeks previous to slaughter of chickens decreased the stability of the fat during frozen storage.

The handling of poultry before freezing has been found to be an additional factor in the frozen storage life of the meat. Wagoner and co-workers (6) indicated that starving poultry for 16 hr. previous to slaughter tended to increase the storage stability of the meat. Cook (7) reported that as long as poultry was handled promptly and properly with respect to pre-cooling, freezing, and storage, no advantage was gained by using rapid rates of freezing. He suggested that a storage temperature of 0°F. was satisfactory for holding poultry for periods as long as one year. It was later reported by Wagoner *et al.* (8) that stability of poultry in frozen storage was decreased when dressed poultry was held at chill room temperature one day or longer before evisceration.

Wagoner and co-workers (9) suggested that serious rancidity in eviscerated poultry probably could be attributed to a longer preliminary holding period rather than to an increased surface area. Most of the available literature regarding frozen storage concerns the treatment and handling of chickens. Much of this information is applicable to turkey, but it is commonly recognized that turkey fat is even more susceptible to rancidity than is chicken fat.

The purpose of this study was (a) to determine satisfactory methods of preparation for each portion of turkey with regard to time of preparation and acceptability of the cooked product, and (b) to study the effect of frozen storage upon certain turkey products.

PROCEDURE

Broad-breasted Bronze turkeys were used throughout the study. The turkeys were chilled thoroughly immediately after slaughter, and an attempt was

[1] Contribution No. 150, Department of Home Economics, Kansas State College. Condensed from the thesis presented by Grayce E. Goertz in partial fulfillment of the requirements for the degree of Master of Science, 1947.

made to keep them cold during the preparation of the filets. Whole birds from which steaks were to be cut were frozen at −10°F. and kept frozen until ready to use.

The first step in the preparation of filets was to disjoint the bird. The tendons were then removed from the drumstick, and each piece was boned. The boned pieces of meat were cut into 3- to 4-oz. portions, cutting with the muscle fibers. Time of preparation and yield from each portion were recorded carefully.

The filets were prepared for freezing in three different ways. In one lot they were cut, wrapped, and frozen without further preparation. In the second lot the cut filets were pounded before being wrapped and placed in frozen storage. In the third lot, the boned turkey meat was cut into approximately 16-oz. portions, wrapped, frozen, and stored. These large portions were cut into filets after being removed from frozen storage in preparation for cooking.

Filets of both dark and light meat for each of the three methods were wrapped in moisture-vapor-proof Cellophane and frozen at −10°F. Samples of each were removed from storage and tested at 30-day intervals until a total of 180 days had elapsed. Filets were defrosted at room temperature for 4 hr. before cooking.

All filets were cooked in moist heat because previous work had shown they were juicier and more palatable than when cooked by dry heat. Some filets were prepared without a coating, but most of them were coated—with flour, then egg, and flour again; with flour and bread crumbs; or with a pour batter, then a mixture of flour and bread crumbs. They were browned in lard, rendered turkey fat, or a hydrogenated fat. A small amount of water was added to all of them. Some were steamed on a surface burner, but most were baked in a 350°F. oven either covered or uncovered from 35 to 45 min.

Steaks were prepared by cutting cross sections from the frozen turkey, using an electric band saw. Twelve steaks, in series of three, were cut from each turkey. The first of the series was cut ¾ in. thick, the next ½ in., and the third 1 in.

In preliminary work the steaks were prepared for braising by three different methods. One lot was dipped in a flour, baking powder, and salt mixture; another lot was marinated in corn oil 45 min. before being dipped in the flour, baking powder, and salt mixture; and the third lot was dipped first in a pour batter and then in a flour and bread crumb mixture. All steaks were cooked by browning in hot fat, then 100 cc. water were added, and they were baked in an uncovered pan for 25 min. at 350°F.

Scraps of raw turkey, including those which were left on the bones after filets were prepared, were cooked in the pressure sauce pan. Two cups water were added to the bones and scraps remaining from one turkey, and they were cooked for 30 min. under 15 lb. pressure. The cooked turkey meat was used in the preparation of various turkey dishes, including turkey à la king, which could be served immediately or frozen for future use. Different starches were used for thickening, eggs were added to some sauces, and a variety of seasonings was used.

Turkey wings, left intact in the latter part of the study, were frozen and later braised.

All products were scored by a palatibility committee as a means of arriving at the most acceptable method of cooking, as a method of determining the effect of storage, or as a measure of the desirability of steaks cut to different thicknesses. As a rule, aroma, appearance, flavor, tenderness, and juiciness were considered, but some modification was necessary in the score card used for the turkey à la king.

RESULTS

The first consideration in the preparation of turkey products was the practicality of such preparation from the standpoint of time involved. In Table 1 are shown both the general weight division of the different portions of the bird and the average time required to prepare a filet from each portion. As the bird was broken down in this study, the meat of the breast and leg (thigh and drumstick) made up approximately 80 per cent of that of the dressed and drawn bird. Seventy-seven per cent of the thigh was utilizable in the preparation of filets, 75 per cent of the breast, and only 15 per cent of the back and rib section.

As shown in Table 1, from 38 seconds to 3 min. and 45 seconds were required to prepare the filets from the different portions. Removal of the tendons from the leg required considerable time, greatly increasing the time required for preparation of this portion. As a result of this time study, it was considered impractical to use the back and rib section and the wings in the preparation of filets. The back and ribs could be used for turkey à la king, and later work indicated the desirability of braising the wings and serving them intact. Progressively more time was required to prepare filets from the breast, from the thigh, and from drumstick, in that order.

The palatability committee preferred the filets

TABLE 1

Data on the preparation of filets from different portions of the turkey

PORTION OF TURKEY	PERCENTAGE OF DRESSED BIRD	PERCENTAGE OF WASTE	NUMBER OF FILETS PER 18-lb. BIRD	AVERAGE TIME TO PREPARE A FILET
Drumstick	31.4	30	8–9	1 min. 54 sec.
Thigh	19.3	23	12–13	0 49
Wing	7.1	72	2–4	3 45
Back and ribs	13.8	85	4–5	3 20
Breast	28.4	25	24–25	0 38

which were dipped in a pour batter then in a mixture of flour and bread crumbs. This coating was palatable, and it seemed to hold in the moisture; the resulting filet was tender and moist. In contrast, the uncoated filets were dry and somewhat tough. Lard and hydrogenated fat were preferred to turkey fat as a medium for browning the filets. Hydrogenated fat was used for the major portion of the study because that of uniform quality was obtained readily. Baking the browned filets in an uncovered pan at 350°F. for 35 min. was found to give the most satisfactory results.

The scores for the stored filets indicated little change in appearance during the 180-day storage period used in this study. The filets were packaged carefully and stored at a uniform temperature so there was little or no dehydration. There was no appreciable change in tenderness, but a slight loss in juiciness. The loss was most evident in the filets which were pounded before freezing and was in line with weight losses which were greatest for the pounded filets.

The desirability of the flavor of filets stored for varying lengths of time is given in Table 2. Both the pounded and unpounded filets lost progressively in quality with increase in storage period. Although the filets prepared from 16-oz. portions did not show a consistent decrease in acceptability, the trend was downward. They were acceptable at the end of 120 days, the longest time these larger portions were held in storage. The pounded filets were still acceptable after 90 days' storage, but at that time they had begun to show a definite loss in quality and scored practically the same as the unpounded did after 180 days of storage. Filets prepared from dark meat were juicer and more acceptable than those from light meat during the first 60 days. However, after that there was a preference for those prepared from light meat.

In a supplementary study, turkey filets were cooked and held under conditions similar to a steam table for periods of 30 and 60 min., after which they were scored. Their acceptability after both periods of holding compared favorably with that of the freshly cooked product. Thus it was concluded that they would be practical to serve in restaurants, cafeterias, and other places where it is necessary to hold the meat for serving later.

TABLE 2

Desirability of flavor of filets after storage

STORAGE TIME	PALATABILITY RATING*				
	Frozen after pounding	Frozen in 16-oz. pieces	Unpounded filets		
			Average	Light meat	Dark meat
days					
30	5.4	5.9	5.9	5.7	6.0
60	5.1	5.1	5.6	5.4	5.8
90	4.7	6.0	5.5	5.6	5.4
120	4.0	5.3	5.1	5.4	4.7
150	—	—	5.0	5.4	4.6
180	—	—	4.8	5.1	4.4

* Highest possible score 7.

Cooked filets were also frozen and after 10 days of storage were found to be highly acceptable.

Steaks which stood for 45 min. in corn oil before cooking were preferred. Those which were cut 1 in. thick were scored higher on every point than those cut $\frac{1}{2}$ or $\frac{3}{4}$ in. in thickness. Much less actual preparation time was involved in cutting the frozen steaks when a comparison was made of the steaks and the filets. However, steaks cut $\frac{1}{2}$ in. thick weighed 341 gm., and those cut 1 in. thick 776 gm.; thus the problem of serving is great. Even if one-half of a $\frac{1}{2}$-in. steak were used, it would weigh about 170 gm., considerably more than the 4 oz. usually considered the maximum size serving. Thus it would seem that for a meal of moderate price, a turkey steak prepared from a cross section of the breast might be prohibitive in cost.

The turkey wings browned in hot fat, then cooked either in a pressure sauce pan or in a covered heat-resistant dish, were highly acceptable.

Turkey à la king proved to be a very desirable method for using scraps of turkey, and it was successfully frozen, stored, and later reheated for serving.

SUMMARY

The purpose of this study was to determine acceptable methods of preparation for given portions of turkey with regard to time of preparation and acceptability. The effect of storage on frozen, uncooked filets and acceptable methods for using turkey scraps in pre-cooked frozen foods were also investigated.

It was found practical to use the breast, thigh, and drumstick for filets, but the wings were used to better advantage when braised and served intact. Scraps remaining after the preparation of the filets could be used successfully in the preparation of turkey à la king. Turkey steaks cut across the breast were also acceptable. Unpounded filets kept well in frozen storage for the duration of the study, 180 days. Turkey kept in 16-oz. portions and made into filets after thawing also kept well, but the pounded filets began to lose quality after 90 days in storage.

Turkey à la king was frozen successfully, but no long time storage study was made on it.

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Tuberculosis in Food Handlers

While rigid rules are laid down by health departments in many of our cities with reference to pre-employment and periodic examinations of food handlers for tuberculosis and the public is being reasonably well protected against the disease from this source, apparently there is a dearth of published reports of the actual findings among the food handlers themselves in comparison with the disease of the general public in the same vicinity. In 1934 Martin, Pessar, and Goldberg reported the results of a tuberculosis survey among 2000 food handlers in New York City. They found approximately 2 per cent with active pulmonary tuberculosis. Unfortunately, the diagnoses were made largely from roentgen shadows. All persons who showed a diffuse or circumscribed infiltration in the pulmonary parenchyma or those with numerous lesions in one or both lungs were regarded as having active tuberculosis. Obviously some of those so reported may have had non-tuberculous disease, since roentgen shadows are not pathognomonic. Moreover, it is never safe to attempt to determine activity of the lesion from a single roentgenologic inspection. Nevertheless, it is likely that many cases of active tuberculosis existed in this 2 per cent. On the basis of these findings, Martin and associates estimated that there were probably 6500 cases of unknown and uncontrolled active tuberculosis among the 325,000 food handlers in New York City. They were of the opinion that this represented the average situation in all large urban communities.

In 1947, the New York Tuberculosis and Health Association made roentgen inspection of the chests of 3460 employees of a company which operates a chain of restaurants. Seven (0.2 per cent) cases of active tuberculosis were found—four in the minimal stage, two moderately advanced, and one far advanced. Two were porters, two candy handlers, two dishwashers, and one a salad maker. There were four others with questionably active tuberculosis and seventy more whose disease was thought to be inactive.

Boucot and Sokoloff examined 32,535 Philadelphia food handlers between April 1, 1947, and January 31, 1948. The reinfection type of tuberculosis was found in 2.3 per cent. This figure is identical with that reported in 1946 by Elkin and associates in a study of 71,767 Philadelphia industrial workers. Among the 25,509 white food handlers, 2.5 per cent, and among the 7026 non-white, 1.9 per cent were reported to have tuberculosis. There were 587 with disease classified as minimal, 147 moderately advanced, and 20 as far advanced. As of March 1, 1948, 66 persons were hospitalized or this had been recommended. Of all the food handlers whose roentgenograms were read as indicating the presence of tuberculosis, subsequent clinical reports were available in 81 per cent after a period of follow-up varying from one to ten months. These confirmed the presence of tuberculosis in 76 per cent.

In Detroit, 48,900 food handlers had roentgen inspections of their chests in 1947, and 135 (0.28 per cent) were found to have active tuberculosis. At the receiving hospital, 18,891 persons had their chests inspected by roentgen ray, and 140 (0.74 per cent) were finally given a diagnosis of active tuberculosis. In a general survey of 9494 persons, 131 (1.4 per cent) had final diagnoses of active tuberculosis. Among 981 practical nurses, 2 (0.2 per cent) had active disease. Under the category "general survey," the figure is somewhat misleading because it covered work in the midst of the heaviest Negro area and included some referrals of suspected cases by physicians and other agencies. Roentgen inspection of the chest is required of food handlers every three years.—*From Queries and Minor Notes, J. A. M. A. 140: 580 (June 11), 1949.*

Retention of Thiamine, Riboflavin, and Niacin in Pork Hearts and Beef Kidneys[1]

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IN THIS study, the thiamine, riboflavin, and niacin content and also the palatability of braised and pressure-cooked pork hearts and of beef kidneys braised and cooked with and without vegetables were compared.

EXPERIMENTAL PROCEDURE

Pork hearts were obtained from a packing house on the day the hogs were slaughtered and placed in a refrigerator (40°F.) overnight. The following morning the hearts were washed and trimmed. To avoid sampling variations, alternate slices cut ¾ in. thick across the grain were used for braising sliced hearts and for analysis of the corresponding raw sample. Hearts to be braised whole or pressure-cooked were cut in halves lengthwise and one-half of each used for analysis. The remaining halves were joined with surgical skin clips for cooking.

Beef kidneys from a local market were washed, trimmed, and cut in sections of about 1 cu. in. A 1-lb. sample was removed for analysis of the raw meat, and the remainder was allowed to stand in water in a refrigerator (40°F.) for about 19 hr. The kidney sections were then drained, rinsed three times, and samples weighing approximately 1 lb. were taken for each of the three cooking methods and for the corresponding soaked raw sample.

Each cooking method was repeated four times. For the hearts, one raw sample was analyzed for each cooking; for the kidneys one raw and one soaked raw sample was analyzed for the three different cooking methods. Drippings from all samples of cooked heart were analyzed as well as the liquid from kidney stew made without vegetables. Since the quantity of drippings from the braised kidneys was small, they were analyzed with the meat. The kidney stew with vegetables was also analyzed as a unit.

[1] This study was supported in part by a grant from the National Live Stock and Meat Board. Received for publication July 1, 1949.

[2] The authors are grateful to Bernice Blum Sheft for analyzing the raw and soaked kidneys in the second experiment.

Cooking Procedures

Braised whole pork hearts. Two hearts were browned in 25 gm. (2 Tbsp.) cooking fat in a heavy skillet; 25 cc. (5 tsp.) water and ¾ tsp. salt were added; and the pan was covered and placed in an oven at 300°F. Baking was continued for 2½ hr. During the last half hour of this period, the internal temperature of the meat, as determined by a thermometer inserted in the muscle, was 96° to 98°C.

Braised sliced pork hearts. The ¾-in. slices of heart were cooked according to the procedure used for baking, except that they were baked for only 2 hr. During the last half hour of this period, the internal temperature of the meat was 96° to 99°C.

Pork hearts cooked in a pressure saucepan. Two hearts, 177 cc. (¾ cup) water, and ¾ tsp. salt were put in a 2-qt. Flex-Seal pressure saucepan and cooked under pressure for 45 min. The pressure was allowed to come down by leaving the saucepan at room temperature. The internal temperature of the meat was 95° to 96°C.

Braised beef kidneys. Soaked kidney sections weighing 454 gm. (1 lb.) were browned in 25 gm. (2 Tbsp.) of cooking fat in a heavy skillet, the pan was covered, and cooking continued over a low heat for 1¼ hr. The gravy was thickened by adding 5 gm. (2 tsp.) flour mixed with 20 cc. (4 tsp.) water, 1 tsp. salt, and ¼ tsp. pepper and cooking 3 min.

Beef kidney stew with vegetables. Soaked kidney sections weighing 454 gm. (1 lb.) were combined with 237 cc. (1 cup) water, 1 tsp. salt, and ¼ tsp. pepper. The saucepan was covered and the meat allowed to simmer for 1½ hr. At the end of that time, 160 gm. (⅓ lb.) carrots and 110 gm. (¼ lb.) onions were added, and cooking was continued for ½ hr. The stew was thickened by adding 15 gm. (2 Tbsp.) flour mixed with 30 cc. (2 Tbsp.) water and cooking 5 min.

Beef kidney stew without vegetables. The stew was made as described above except that simmering continued 2 hr., no vegetables or pepper were added, and the stew was not thickened. Kidneys were prepared in this way so that the retention of vitamins

during stewing might be calculated. Such a calculation was not possible for the stew with vegetables because of the vitamin content of the vegetables.

Analytical Procedures

For analysis, the raw or cooked pork heart was ground three times in an electric meat grinder, using a fine plate and stirring with a spoon between each grinding. The raw sample was then blended for 5 min. in a Waring Blendor. The cooked samples of heart were too dry for blending. Meat from the kidney stew without vegetables was ground in the same manner as the heart samples. Raw beef kidney and that cooked by the other methods were blended 3 min. in a Waring Blendor without preliminary grinding. Drippings from the cooked pork hearts were heated to 50°C. in a covered bottle and blended 1 min.

Samples of the meat or drippings were weighed into extraction shells and dried to constant weight *in vacuo* at 93° to 100°C. Fat was extracted from these dried samples for 48 to 56 hr. with carbon tetrachloride. All determinations were made in duplicate, but only half of the samples of pork hearts were analyzed for moisture and fat.

For the vitamin determinations, 100-gm. aliquots of the meat were blended with 100 cc. 0.1 N sulphuric acid for all samples except cooked pork hearts for which 200 cc. acid were used. Aliquots equivalent to 20 gm. of raw or cooked meat were then weighed into 500-cc. Erlenmeyer flasks, the total acid volume brought to 100 cc., and to *p*H adjusted to 4.4 to 4.6 by adding 5 cc. of 2.5 M sodium acetate containing 400 mg. papain and 400 mg. takadiastase. Ten-gm. samples of drippings were transferred to 250-cc. flasks for analysis. The liquid from kidney stew made without vegetables was blended 1 min., and 50-gm. aliquots transferred to 500-cc. flasks. Fifty cc. 0.1 N sulphuric acid and sodium acetate, and enzyme in the same proportions as for the meat digests were added to each sample. The thiamine, riboflavin, and niacin content of the meat and drippings samples was determined as for sweetbreads (1).

Retentions of vitamins were calculated from the ratio of the total vitamin content of the cooled, cooked meat, drippings, or both to that of the corresponding weight of raw meat, as was done for sweetbreads (1). By this method, the use of analytical data for moisture and fat with their experimental errors was avoided in the calculations. The values for vitamins for the raw meat serving as a control for each cooking method were used, rather than the average for all the raw samples.

Through an oversight, corresponding weights of raw and soaked kidneys were not recorded in the original experiment. To correct this error, four samples each of raw and soaked kidneys were analyzed in a second experiment. Retentions of cooked kidneys on the raw weight basis were calculated by multiplying the retention in the soaked samples compared with raw meat obtained in the second experiment by the retention of cooked samples compared with soaked meat obtained in the original experiment.

Palatability tests for all the cooked meat except the kidney stew without vegetables were made as for sweetbreads (1).

RESULTS AND DISCUSSION

The weights of the raw meat used and of the cooked products obtained for the four replicates of each cooking method were averaged and are shown in Table 1. The analytical data are given in Table 2.

TABLE 1

Weights of pork hearts and beef kidneys*

SAMPLE	WEIGHT OF MEAT		WEIGHT OF COOLED COOKED PRODUCTS		
	Raw	Soaked	Meat	Drippings or liquid	Tota
	gm.	*gm.*	*gm.*	*gm.*	*gm.*
Pork hearts					
Braised whole	686		396	266	662
Braised sliced	612		340	206	546
Pressure-cooked	556		299	224	523
Beef kidneys					
Soaked (second experiment)	1705	2166			
Braised		454			301
Stew with vegetables		455			770
Stew without vegetables		453	205	205	410

* Each figure is the average of four replicates.

Pork Hearts

The average thiamine content of the raw pork hearts, 3.66 mcg. per gm., was lower than that of two samples containing 5.2 and 7.0 mcg. per gram reported by Waisman and Elvehjem (2) using the rat-growth method. The riboflavin content, 11.9 mcg. per gram, was very close to the 11.2 mcg. per gram obtained by Mickelsen, Waisman, and Elvehjem (3), while the niacin content, 60.5 mcg. per gram, falls between the figures of 53.4 and 80 mcg. per gram obtained respectively by Bandier (4) using the cyanogen bromide method and Waisman and Elvehjem (2) using the dog assay.

The thiamine retentions of braised whole and sliced pork heart were 77 and 74 per cent, respectively. These figures are considerably higher than those of 41 per cent for braised veal heart and 31 per cent for braised baby beef heart obtained by McIntire *et al.* (5), possibly because of the longer cooking periods they used. Pork hearts cooked in a pressure saucepan retained 58 per cent of the thiamine. Probably the greater loss on cooking by this method than by braising is due to the thermolability of thiamine.

TABLE 2

Analytical data for raw and cooked pork hearts and beef kidneys

SAMPLE	MOISTURE	FAT	THIAMINE			RIBOFLAVIN			NIACIN		
			Content		Retention*	Content		Retention*	Content		Retention*
			Average	Range		Average	Range		Average	Range	
	%	%	*mcg./gm.*	*mcg./gm.*	%	*mcg./gm.*	*mcg./gm.*	%	*mcg./gm.*	*mcg./gm.*	%
Pork hearts											
Raw	74	7.7	3.66	2.84–4.51		11.9	10.4–13.7		60.5	47.0–73.0	
Braised whole											
Meat	62	10.6	2.50	2.34–2.69	42	13.7	11.2–16.1	68	53.3	41.4–69.9	52
Drippings	88	8.7	3.18	2.64–3.80	35	9.2	8.4– 9.5	30	59.2	49.6–73.2	39
Total					77			98			91
Braised sliced											
Meat	63	7.1	3.02	2.51–3.58	44	13.7	12.3–15.9	61	54.2	44.5–73.4	49
Drippings	87	9.0	3.43	3.12–3.56	30	12.9	12.0–14.4	35	58.5	50.4–75.0	32
Total					74			96			81
Pressure-cooked											
Meat	63	9.0	2.16	1.53–2.64	31	13.2	11.7–14.4	62	53.6	42.1–67.1	46
Drippings	91	4.4	2.41	1.89–3.61	27	9.8	8.9–11.8	34	51.4	40.6–72.7	33
Total					58			96			79
Beef kidneys											
Raw											
Original experiment	79	2.4	3.52	3.33–3.84		28.8	26.3–31.5		52.9	50.0–56.5	
Second experiment	80		4.21	3.98–4.32		26.8	25.5–28.1		62.1	55.8–65.3	
Soaked raw											
Original experiment			2.51	2.26–2.65		22.6	20.8–23.8		36.8	34.4–40.6	
Second experiment	86		2.90	2.70–3.16	88	19.5	18.8–20.2	93	39.6	38.0–40.4	81
Braised†	66	10.3	2.76	2.54–3.13	64	30.8	28.6–32.3	84	51.7	47.8–56.3	76
Stew with vegetables			1.16	1.00–1.35		13.4	10.8–17.4		19.7	17.4–21.7	
Stew without vegetables											
Meat	68	2.6	1.54	1.38–1.76	24	31.4	30.6–31.9	58	36.3	31.6–40.3	36
Liquid			1.87	1.64–2.12	29	19.1	18.0–20.1	35	41.1	35.0–47.8	40
Total					53			93			76

* On basis of raw weight. In calculating retentions, the vitamin value for the raw meat serving as the control for each cooking method was used rather than the average for all the raw samples.

† Drippings were included with the meat.

Riboflavin retentions were uniformly high for pork hearts, being 98 per cent for those braised whole and 96 per cent for those cooked by the other two methods. The best retention of niacin, 91 per cent, was obtained for hearts braised whole. Braised sliced and pressure-cooked whole hearts retained 81 per cent and 79 per cent niacin, respectively. These riboflavin and niacin retentions of pork hearts compare closely with those of veal and baby beef hearts analyzed by McIntire *et al.* (5).

It will be noted that the drippings of hearts cooked by the three methods contained about a third (27 to 39 per cent) of the vitamins present in the raw meat. Indeed, the thiamine contents of the heart and its drippings cooked in the pressure saucepan, 31 and 27 per cent, were almost equal. Thus, the importance of using all the drippings is evident.

To furnish a basis of comparison of pork hearts with other foods, the proportions of the daily dietary allowances furnished by a serving of heart have been calculated. The National Research Council Allowances for a physically active man (6) were used, and the amount of cooked meat obtained from a 120-gm. raw sample. Braised whole, braised sliced, and pressure-cooked whole hearts furnished 21, 22, 17 per cent of the daily thiamine allowance; 77, 79, and 73 per cent of the riboflavin need; and 44, 39, and 39 per cent of the niacin requirement, respectively. The high riboflavin and niacin content of hearts is evident from these figures.

Beef Kidney

Averaging the vitamin content of raw beef kidneys as found in the two experiments, the thiamine content, 3.86 mcg. per gram, may be compared with values previously reported of 1.71 mcg. per gram using the thiochrome method of assay (7) and 2.1 to 3.2 mcg. per gram using the rat growth (2) method. The riboflavin content of the kidneys, 27.8 mcg. per gram, was higher than the average figure—20.2 mcg. per gram—obtained by the microbiologic method (2), or the 8 to 16 mcg. per gram and 10.8 mcg. per

TABLE 3

Palatability scores for cooked pork hearts and beef kidneys*

SAMPLE	APPEARANCE	ODOR		FLAVOR		TEXTURE	AMOUNT OF JUICE	COMPOSITE RATING
		Intensity	Desirability	Intensity	Desirability			
Pork hearts								
Braised whole	4.2	3.9	4.0	3.6	3.9	4.2	3.3	3.7
Braised sliced	4.4	4.0	3.9	3.5	4.0	3.8	2.8	3.4
Pressure-cooked	3.0	3.8	3.2	3.0	3.2	3.1	2.8	2.8
Beef kidneys								
Braised	2.9	3.0	3.1	2.9	3.2	3.6	3.3	3.2
Stew with vegetables	3.7	3.2	2.8	3.0	3.2	4.1	3.6	3.1

* Scores are on the basis of five points as being the most desirable or intense rating, and on one point the least desirable or intense. Each number is the average of the grades given by four or five judges for four replications.

gram reported for the photometric method (8, 9). The kidneys used in this study contained 57.5 mcg. per gram niacin—less than those analyzed by McIntire *et al.* (10) which contained 83 and 64 mcg. per gram, but similar to those reported by Bandier (4) which contained 65.6 mcg. per gram in the cortex and 51.7 mcg. per gram in the medulla.

In order to obtain a palatable product, it seemed essential to soak sliced raw kidneys in water overnight before cooking. Since this treatment caused the kidneys to gain 27 per cent in weight due to water inbibition, it resulted in a decreased vitamin content per gram of soaked tissue. However, the leaching effect of the water was not excessive, since the retentions on soaking were 88 per cent for thiamine, 93 per cent for riboflavin, and 81 per cent for niacin. Braising resulted in a further loss, bringing the retentions of these three vitamins down to 64, 84, and 76 per cent when calculated on the raw weight basis. These figures were lower than the corresponding ones for braised sliced hearts.

The thiamine retention of stew prepared without vegetables was 53 per cent, a lower figure than for braising. Such a finding would be expected from the fact that the stew was cooked 2 hr. and the braised kidneys for 1¼ hr., since previous work has indicated that thiamine losses in meat usually increase with increased cooking periods. The riboflavin retention (93 per cent) for stewed kidneys was better than that for braised kidneys, while the niacin contents of meat cooked by these two methods were the same. It will be noted that more than half of the total thiamine and niacin and more than a third of the riboflavin of the stew without vegetables was in the liquid portion.

The vitamin retention of kidney stew with vegetables cannot be calculated because of the addition of vegetables, but an analysis of this stew is included. The content of the three vitamins per gram of stew was lower in the stew with vegetables than for kidneys cooked by the other two methods because of the addition of vegetables having a lower vitamin content than the meat.

The contributions to the recommended allowances made by a serving of kidneys equivalent to 120 gm. raw meat have been calculated as for hearts. Braised kidneys and stew with vegetables furnished 19 and 20 per cent of the thiamine, 173 and 193 per cent of the riboflavin, and 35 and 34 per cent of the niacin requirements, respectively. Thus, the extraordinarily high riboflavin content of kidneys is illustrated.

Palatability Scores

The palatability scores shown in Table 3 indicate that the judges found braised hearts either whole or sliced more palatable than those cooked in a pressure saucepan. There was little difference in the palatability scores for braised and stewed kidneys except that the appearance of the stew was preferred.

CONCLUSIONS

The thiamine, riboflavin, and niacin content of raw, braised, and pressure-cooked pork hearts, and of raw, soaked, braised, and stewed beef kidneys was determined. The soaking which was necessary to prepare palatable kidneys resulted in losses of 7 to 19 per cent of the three vitamins. Thiamine losses were highest in meat cooked at an elevated temperature, as pressure-cooked hearts, or for a long period, as kidney stew. Riboflavin was well retained during the cooking of both meats, while losses of niacin were somewhat greater than those for riboflavin.

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Glutamic Taste

When monosodium glutamate was first produced in Japan a generation ago, it was claimed by some to produce a meaty flavor. Its developer, Ikeda, however, was more cautious and explicit and said that it had a "glutamic taste," implying that this was something new among tastes. The meaty association may have been mostly wishful thinking for meat was a scarce and much-appreciated food, or again the claim may have been allowable within the limits of advertisers' license. At any rate, the thought that glutamate had a meaty taste came to this country along with the glutamate, and that thought still persists. Some users call glutamate "chicken" rather than meaty while still others deny all meaty association.

The writer, in 1932, studied the taste of purified glutamic acid and its monosodium salt. We sought to analyze the glutamic taste, to find out if it had some unique characteristic which made it exceptional among tastes. We made up solutions of sugar, salt, tartaric acid, and caffeine and combined these in various ways in the attempt to match the taste of sodium glutamate. At that time, we felt well enough satisfied that the glutamic taste was considered as operating only through the usual four kinds of taste buds.

Today, we find a "tingling feeling" factor in addition to taste. Besides, there is marked persistency of taste sensation. The persistent effect is present in the whole of the mouth region, including the roof of the mouth and the throat. It is difficult to describe this sensation other than to call it a "feeling of satisfaction."

What can be the cause of this glutamic effect, which is apparently independent of true taste, but which adds psychologically to the flavor of whatever has been eaten? It is suggested that monosodium glutamate may act as a functional amine which reaches and stimulates nerve endings lying within the buccal cavity. In any event, it is proper to consider glutamate as a stimulator of the sense of feeling as well as that of taste, and the indications are that it is unique in this capacity.

Pure odorless sodium glutamate has considerable taste value, detectable in concentrations as low as .03 per cent, strong at .5 per cent, but not apparently much stronger at greater concentration. By direct observation, the taste of solid glutamate appears to be only salty and sweet, whereas in solution all four components are obvious.

The taste of glutamic acid is reminiscent of that of sodium glutamate, but is much sourer. The *p*H of glutamic acid is about 3.3 and that of monosodium glutamate, 7.0, in concentrations of about 0.2 per cent, such as might be used in foods. Since the *p*H values of almost all foods in which glutamate is used fall between these two points, it is probable that both the mono-acid and the di-acid glutamate ions are present. Due to the great buffering action of the saliva and of the tissues of the tongue, we get the glutamate taste whether glutamic acid or its monosodium salt is applied to the taste buds, and therefore we cannot tell from direct observations which ion is responsible for the taste. We vote for the mono-acid ion in view of what is now known, but the grounds for choice are not too secure.

The typical or characteristic flavor of cooked meat has been found to consist of aroma produced by the action of heat on meat fiber. This is true of all kinds of meats, including chicken. The taste of meat is slight compared with the aroma. This taste resides in the juice, and it is not significantly affected by cooking. Meat flavor is principally smelled rather than tasted.

Pure glutamate has taste but essentially no odor. In this fundamental respect it cannot substitute for meat. It is not meaty, or chickeny, and the reason for its successful use in food must be sought in some other direction.

The association of early lots of glutamate with meatiness cannot be ascribed principally to the strong odor of the crude glutamate when available. The pure glutamate commercially available today is not meaty; yet it has greater value in foods in reinforcing or accentuating their natural flavors than the old odoriferous glutamate.—*E. C. Crocker* in *Monosodium Glutamate—A Symposium. Chicago: Quartermaster Food and Container Institute, 1948, pp. 26–30.*

Editorial

THE GOALS OF EDUCATING FOR A PROFESSIONAL CAREER

What should be the result of educating a person for a professional career? What objectives are to be sought? The dietetic interns at the Colorado State Hospital held an open discussion to see if they could enumerate and clarify these important questions. Listed below are the points we consider as goals, according to their importance.

It is, of course, of primary importance that the individual's skill as a specialist be developed. The individual who goes into a profession must be highly trained in order to be able to understand and meet the complex problems which face her.

Second, the art of human relations—living and working happily with those whom one is in contact—is an aim for which all should be striving constantly. Insight and understanding of human nature makes one's work simpler, more satisfying and more effective. It creates an atmosphere of unity, cooperation, and warmth which is desirable to the individual, to the department in which she may be employed, and to the organization as a whole. Need the difference even be noted here between the situation described above and that of individuals or groups who are antagonistic, who accomplish little as a result of misunderstanding, intolerance, and conflict?

But how can one grow in her work both technically and in human intercourse? Only by developing a third quality—that of an inquiring mind. The professional person should keep herself well informed in her particular field by developing a continuous attitude of curiosity toward the new developments in that field. A similar attitude toward the many other phases which constitute our present knowledge will make her an attractive, dynamic individual. Those who develop and maintain a curiosity about their work will be the ones who will contribute most to progress, for they will be the ones to try and accept new truths. It will not be those who have allowed their minds and attitudes to stagnate.

The fourth quality is that of a sense of responsibility for making a contribution to society. Education should instill in a person a sense of responsibility to the work she has chosen for a career. Having acquired the knowledge, background, and capacity for greater accomplishment, she should have a sincere desire to give of herself to the progress of that work and, consequently, to the progress of society.

An inquiring mind also develops a fifth quality—an appreciation of fields other than one's own. There is a tendency for one who has had technical training to forget or become indifferent to the many other fields of study and nature; such a person should endeavor to become interested in some of the many varying phases of life. A good education means a balanced one, and those who have been so thoroughly trained in technique and science should have some understanding and interest in other diverse subjects. A well balanced education helps one to realize more fully that her profession is not all knowledge and helps her to evaluate it accurately, as part of the whole of knowledge.

How can one contribute the benefits of her training and knowledge most effectively? Only with the sixth quality—ease and clarity of expression to the public and to individuals. The ability to speak and write dynamically, to be persuasive, influential, and accepted is essential when one has something worthy of expression.

Each one of these qualities is interwoven and affected by the others; each enhances the others. Has your education helped develop these parts of you? And have you continued growing since you finished your formal education? Measure yourself against these standards and see what your education has done for you.—*Jean Zumwalt, Dietetic Intern, Colorado State Hospital, Pueblo.*

EMMA B. AYLWARD

Emma B. Aylward, a charter member of the Chicago Dietetic Association and the American Dietetic Association, passed away July 19 at her home in Manly, Iowa.

After her graduation from Lewis Institute, now the Illinois Institute of Technology, Miss Aylward accepted the position of Dietitian and Matron of the Presbyterian Hospital School of Nursing, Chicago. This position she held until her retirement.

As a pioneer in dietetics, particularly in the field of institution management, Miss Aylward helped to build the foundation for our Association. She was unusually alert to new trends and was able to evaluate the practicality of new equipment and new systems of organization. She was a member of the committee of the Chicago Dietetic Association which published a cook book, *Recipes for Institutions*, (Mac-

millan, 1922), which was one of the first books on large quantity cookery to use tested recipes.

As editor in 1924 of the *Bulletin of the Chicago Dietetic Association* Miss Aylward blazed the trail of publication in the field of dietetics which led to the founding of this JOURNAL in 1925. In the five issues of the *Bulletin* which were published as Volume I can be found reports of section activities, abstracts of current literature, news of state and local associations—all evidence of Miss Aylward's efforts to edit a *Bulletin* which would be of interest and value to a field rapidly gaining in professional status.

Miss Aylward was a person of many interests. She was a frequent attendant at the opera; she enjoyed travel and was interested and actively participated in civic affairs.

She will be remembered by those who knew her for her loyalty to any cause she felt was right, for her keen interest and enthusiasm, and her sense of humor. One of her happy memories was the recognition given all charter members at the meeting of the American Dietetic Association in Detroit in 1942.—*Beulah Hunzicker, Editor, Bulletin of the Illinois Dietetic Association.*

PEARL JACKSON TO RECEIVE MARY SWARTZ ROSE FELLOWSHIP

Pearl Jackson will be honored at the Annual Banquet climaxing the 32nd Annual Convention of the American Dietetic Association in Denver, when she will be presented as the first recipient of the Mary Swartz Rose Fellowship. This Fellowship was established by a grant made by the Nutrition Foundation, Inc., to symbolize the ideals of dietitians. Named after Mary Swartz Rose, one of the true pioneers in the field of education in nutrition and dietetics, the Fellowship amounts to $1000 and is awarded for graduate study and research in nutrition or allied fields.

To be eligible for this fellowship an applicant must (a) be a member of the American Dietetic Association, (b) have ranked in the upper quartile of her graduating class, (c) have majored as an undergraduate in a field closely related to that in which the Fellowship is sought or have gained equivalent training later, and (d) show promise of making a valuable contribution to the profession.

Miss Jackson was awarded this fellowship to pursue work toward the degree of Doctor of Philosophy at Iowa State College, Ames, where she is working on a dual major in experimental foods and institution management problems. She holds both a bachelor's and a master's degree from Purdue University, and took a dietetic internship at the Johns Hopkins Hospital, Baltimore. Upon completion of her dietetic internship, she served as a temporary member of the dietary staff of the Johns Hopkins Hospital and was then dietitian at the NYA Residence Center in Indianapolis for a year. From there she went to Michigan State College, East Lansing, where she has been on the faculty and staff for the last seven years. She is now on leave of absence from her position of resident manager of Landon Hall and Assistant Professor of Institution Administration. In this capacity, she has also organized and instituted the work of a test kitchen in the women's residence halls and is planning her present graduate work so that it will be of aid to her in directing the work of this test kitchen as it expands.

THE A.D.A. STAFF

The Executive Board of the American Dietetic Association announces that Verna A. McKinley has joined the Association staff, replacing Ruth Jubb McDonnell whose resignation will become effective on November 1.

With her splendid background of dietetic experience, Mrs. McKinley is especially well suited to meet the responsibilities in the Placement Bureau of the Association. Her wide acquaintance with members of the Association, her keen insight into the problems of the dietitian, as well as those faced by the hospital administrator and other employers, will serve her well in locating members in suitable positions. For a number of years, Verna Ansorge McKinley was on the dietary staff at the Methodist Hospital, Indianapolis, first as Assistant Dietitian and for over six years as Chief Dietitian. During that time, an approved dietetic internship was offered at the Methodist Hospital. These positions followed directly her dietetic training at City Hospital, Indianapolis. Mrs. McKinley's dietetic experience includes teaching and writing whenever time has permitted. She is a native of Wisconsin and early in her career attended Stout Institute, Menomonie. She holds a Bachelor of Arts degree from Butler University, Indianapolis, and has taken some graduate work at Indiana University.

Last month Mrs. McKinley attended the fifty-first annual meeting of the American Hospital Association in Cleveland, where she had an opportunity to discuss with hospital administrators the many problems of the placement of dietitians.

This year as the Placement Bureau celebrates its twenty-fifth anniversary, the Association looks forward to continued service to members and employers. Members attending our own convention in Denver had the opportunity to meet with Mrs. McKinley and to become better informed about the services of the Placement Bureau.

According to the 1949 edition of the *American Hospital Directory*, compiled by the American Hospital Association, the total wages and salaries paid to 938,841 full-time employees in all hospitals during 1948 were $1,632,880,000. It is estimated that each patient in a general hospital requires an average of 1.7 full-time employees to provide his care.

Current Comment

EFFECT OF BETWEEN-MEAL NOURISHMENTS ON TRAY FOOD WASTE[1]

EDNA MAE LUNDGREN[2] and JAMES F. HAMMARSTEN, M.D.[3]

The following study was performed to determine whether the amount of edible tray waste would change when the quantity of between-meal nourishments was decreased.

METHOD

Two medical wards at Veterans Administration Hospital, Minneapolis, were chosen for study. During a control period of one month, the patients were given an adequate diet and between-meal nourishments as ordered by ward physicians. The edible food left on all trays was weighed after each meal, and the amount of between-meal nourishments sent to the wards was recorded daily.

During a test period of one month, an adequate diet was given but the between-meal nourishments were eliminated except for the patients with peptic ulcer and for one patient with portal cirrhosis. The edible food left on all trays was weighed as during the control month.

The average daily census in the combined wards during both months was about the same: 97.6 for the control month and 99 for the test month. During both months the patients were not prevented from buying nourishments at the canteen or from the traveling canteen cart.

RESULTS

The results of the study are shown in Table 1. Since ulcer patients received milk and cream hourly, the amount of nourishments consumed during the test month was still appreciable. The average daily number of ulcer patients was approximately the same during both months, nine during the control period and eight during the test period. However, the amount of nourishments was significantly decreased.

TABLE 1

Daily between-meal nourishment consumption and edible tray waste

DAY	BETWEEN-MEAL NOURISHMENT		EDIBLE TRAY WASTE AT MEALS	
	Control month*	Test month†	Control month	Test month
	qt.	*qt.*	*lb.*	*lb.*
1	19 + 3 sandwiches	23	73	55
2	23 + 4 sandwiches	22	68	82
3	17 + 1 sandwich	18	73	74
4	26 + 1 sandwich	16	63	92
5	16 + 4 sandwiches	16	86	70
6	19 + 2 sandwiches	13	57	58
7	24 + 2 sandwiches	21	68	96
8	17 + 1 sandwich	18	77	69
9	20 + 1 sandwich	—	73	86
10	29 + 1 sandwich	13	79	86
11	29 + 1 sandwich	17	86	81
12	14 + 1 sandwich	14	84	63
13	34	19	88	68
14	19	13	95	70
15	24	7	100	57
16	19	10	85	77
17	25	9	77	55
18	27	11	75	70
19	12	20	80	56
20	21	20	94	47
21	20	12	106	62
22	22	18	93	51
23	16	15	85	64
24	27	10	87	65
25	14	12	91	68
26	15	21	79	60
27	26	22	79	69
28	19	16	76	58
29	19	—	74	—
30	24	—	77	—
31		—	71	—
Total....	636	426	2499	1909
Mean....	21.2	15.8	80.6	68.2

* Served to all patients on two medical wards, including eight ulcer patients.

† Served to nine ulcer patients and one patient with portal cirrhosis.

[1] Published with permission of the Chief Medical Director, Department of Medicine, Veterans Administration, who assumes no responsibility for the opinions expressed or conclusions drawn by the authors.

[2] Dietitian, Veterans Administration Hospital, Minneapolis.

[3] Department of Internal Medicine, University of Minnesota School of Medicine, and the Veterans Administration Hospital, Minneapolis.

millan, 1922), which was one of the first books on large quantity cookery to use tested recipes.

As editor in 1924 of the *Bulletin of the Chicago Dietetic Association* Miss Aylward blazed the trail of publication in the field of dietetics which led to the founding of this JOURNAL in 1925. In the five issues of the *Bulletin* which were published as Volume I can be found reports of section activities, abstracts of current literature, news of state and local associations—all evidence of Miss Aylward's efforts to edit a *Bulletin* which would be of interest and value to a field rapidly gaining in professional status.

Miss Aylward was a person of many interests. She was a frequent attendant at the opera; she enjoyed travel and was interested and actively participated in civic affairs.

She will be remembered by those who knew her for her loyalty to any cause she felt was right, for her keen interest and enthusiasm, and her sense of humor. One of her happy memories was the recognition given all charter members at the meeting of the American Dietetic Association in Detroit in 1942.—*Beulah Hunzicker, Editor, Bulletin of the Illinois Dietetic Association.*

PEARL JACKSON TO RECEIVE MARY SWARTZ ROSE FELLOWSHIP

Pearl Jackson will be honored at the Annual Banquet climaxing the 32nd Annual Convention of the American Dietetic Association in Denver, when she will be presented as the first recipient of the Mary Swartz Rose Fellowship. This Fellowship was established by a grant made by the Nutrition Foundation, Inc., to symbolize the ideals of dietitians. Named after Mary Swartz Rose, one of the true pioneers in the field of education in nutrition and dietetics, the Fellowship amounts to $1000 and is awarded for graduate study and research in nutrition or allied fields.

To be eligible for this fellowship an applicant must (a) be a member of the American Dietetic Association, (b) have ranked in the upper quartile of her graduating class, (c) have majored as an undergraduate in a field closely related to that in which the Fellowship is sought or have gained equivalent training later, and (d) show promise of making a valuable contribution to the profession.

Miss Jackson was awarded this fellowship to pursue work toward the degree of Doctor of Philosophy at Iowa State College, Ames, where she is working on a dual major in experimental foods and institution management problems. She holds both a bachelor's and a master's degree from Purdue University, and took a dietetic internship at the Johns Hopkins Hospital, Baltimore. Upon completion of her dietetic internship, she served as a temporary member of the dietary staff of the Johns Hopkins Hospital and was then dietitian at the NYA Residence Center in Indianapolis for a year. From there she went to Michigan State College, East Lansing, where she has been on the faculty and staff for the last seven years. She is now on leave of absence from her position of resident manager of Landon Hall and Assistant Professor of Institution Administration. In this capacity, she has also organized and instituted the work of a test kitchen in the women's residence halls and is planning her present graduate work so that it will be of aid to her in directing the work of this test kitchen as it expands.

THE A.D.A. STAFF

The Executive Board of the American Dietetic Association announces that Verna A. McKinley has joined the Association staff, replacing Ruth Jubb McDonnell whose resignation will become effective on November 1.

With her splendid background of dietetic experience, Mrs. McKinley is especially well suited to meet the responsibilities in the Placement Bureau of the Association. Her wide acquaintance with members of the Association, her keen insight into the problems of the dietitian, as well as those faced by the hospital administrator and other employers, will serve her well in locating members in suitable positions. For a number of years, Verna Ansorge McKinley was on the dietary staff at the Methodist Hospital, Indianapolis, first as Assistant Dietitian and for over six years as Chief Dietitian. During that time, an approved dietetic internship was offered at the Methodist Hospital. These positions followed directly her dietetic training at City Hospital, Indianapolis. Mrs. McKinley's dietetic experience includes teaching and writing whenever time has permitted. She is a native of Wisconsin and early in her career attended Stout Institute, Menomonie. She holds a Bachelor of Arts degree from Butler University, Indianapolis, and has taken some graduate work at Indiana University.

Last month Mrs. McKinley attended the fifty-first annual meeting of the American Hospital Association in Cleveland, where she had an opportunity to discuss with hospital administrators the many problems of the placement of dietitians.

This year as the Placement Bureau celebrates its twenty-fifth anniversary, the Association looks forward to continued service to members and employers. Members attending our own convention in Denver had the opportunity to meet with Mrs. McKinley and to become better informed about the services of the Placement Bureau.

According to the 1949 edition of the *American Hospital Directory*, compiled by the American Hospital Association, the total wages and salaries paid to 938,841 full-time employees in all hospitals during 1948 were $1,632,880,000. It is estimated that each patient in a general hospital requires an average of 1.7 full-time employees to provide his care.

Current Comment

EFFECT OF BETWEEN-MEAL NOURISHMENTS ON TRAY FOOD WASTE[1]

EDNA MAE LUNDGREN[2] and JAMES F. HAMMARSTEN, M.D.[3]

The following study was performed to determine whether the amount of edible tray waste would change when the quantity of between-meal nourishments was decreased.

METHOD

Two medical wards at Veterans Administration Hospital, Minneapolis, were chosen for study. During a control period of one month, the patients were given an adequate diet and between-meal nourishments as ordered by ward physicians. The edible food left on all trays was weighed after each meal, and the amount of between-meal nourishments sent to the wards was recorded daily.

During a test period of one month, an adequate diet was given but the between-meal nourishments were eliminated except for the patients with peptic ulcer and for one patient with portal cirrhosis. The edible food left on all trays was weighed as during the control month.

The average daily census in the combined wards during both months was about the same: 97.6 for the control month and 99 for the test month. During both months the patients were not prevented from buying nourishments at the canteen or from the traveling canteen cart.

RESULTS

The results of the study are shown in Table 1. Since ulcer patients received milk and cream hourly, the amount of nourishments consumed during the test month was still appreciable. The average daily number of ulcer patients was approximately the same during both months, nine during the control period and eight during the test period. However, the amount of nourishments was significantly decreased.

TABLE 1

Daily between-meal nourishment consumption and edible tray waste

DAY	BETWEEN-MEAL NOURISHMENT		EDIBLE TRAY WASTE AT MEALS	
	Control month*	Test month†	Control month	Test month
	qt.	*qt.*	*lb.*	*lb.*
1	19 + 3 sandwiches	23	73	55
2	23 + 4 sandwiches	22	68	82
3	17 + 1 sandwich	18	73	74
4	26 + 1 sandwich	16	63	92
5	16 + 4 sandwiches	16	86	70
6	19 + 2 sandwiches	13	57	58
7	24 + 2 sandwiches	21	68	96
8	17 + 1 sandwich	18	77	69
9	20 + 1 sandwich	—	73	86
10	29 + 1 sandwich	13	79	86
11	29 + 1 sandwich	17	86	81
12	14 + 1 sandwich	14	84	63
13	34	19	88	68
14	19	13	95	70
15	24	7	100	57
16	19	10	85	77
17	25	9	77	55
18	27	11	75	70
19	12	20	80	56
20	21	20	94	47
21	20	12	106	62
22	22	18	93	51
23	16	15	85	64
24	27	10	87	65
25	14	12	91	68
26	15	21	79	60
27	26	22	79	69
28	19	16	76	58
29	19	—	74	—
30	24	—	77	—
31		—	71	—
Total....	636	426	2499	1909
Mean....	21.2	15.8	80.6	68.2

* Served to all patients on two medical wards, including eight ulcer patients.

† Served to nine ulcer patients and one patient with portal cirrhosis.

[1] Published with permission of the Chief Medical Director, Department of Medicine, Veterans Administration, who assumes no responsibility for the opinions expressed or conclusions drawn by the authors.

[2] Dietitian, Veterans Administration Hospital, Minneapolis.

[3] Department of Internal Medicine, University of Minnesota School of Medicine, and the Veterans Administration Hospital, Minneapolis.

The mean waste per day during the control period was 80.6 lb. This was reduced to 68.2 lb. during the test period. The difference between these means was highly significant when analyzed statistically according to the method of Snedecor (1) ($t = 4.2$, $df = 57$, $p < .001$).

DISCUSSION

Every month at Veterans Administration hospitals the nutritional value of one day's menu is calculated, using the short method for dietary analysis of E. G. Donelson and J. M. Leichsenring (2). The date for this analysis is designated by a Central Office supervisor and is not known to the menu planner. During both the control month and the test month, the nutritional value of the three meals as calculated exceeded the 1948 dietary allowances for the 154 lb. sedentary man except for ascorbic acid for the test period which was 14 mg. below recommendations (2, 3) (See Table 2).

TABLE 2

Calculated nutritional value of foods served during control and test periods

PERIOD	CALORIES	PROTEIN	CALCIUM	IRON	VITAMIN A	THIAMINE	RIBOFLAVIN	NIACIN	ASCORBIC ACID
		gm.	*mg.*	*mg.*	*I.U.*	*mg.*	*mg.*	*mg.*	*mg.*
Control*	2678	105.8	1.62	18.3	18,806	1.78	2.79	12.79	110
Test*	3063	108.4	1.42	13.1	5,648	1.27	2.80	15.74	61
Recommended dietary allowance for sedentary man	2400	70	1.0	12	5,000	1.20	1.80	12	75

* Excluding nutrients furnished by between-meal nourishments.

It is believed that the patients left food on their trays because they anticipated receiving between-meal nourishments, and because their appetite was inhibited by previous between-meal feedings.

Complete consumption of the diet as presented furnished more of the essential nutrients than a haphazard selection by the patient of the food served and the between-meal nourishment. Three widely used nourishments—eggnog, malted milk, and orange juice—are poor sources of niacin, thiamine, iron, and vitamin A.

In addition to the nutritional factors, the economic aspects are also important. The saving of 590 lb. of food for a thirty-day month when between-meal feedings were discontinued indicates that between-meal nourishments should be ordered more judiciously.

CONCLUSION

The amount of edible tray waste decreased significantly when the quantity of between-meal nourishments was reduced.

REFERENCES

(1) Snedecor, G. W.: Statistical Methods. 4th ed. Ames, Iowa: Iowa State College Press, 1946.

(2) Donelson, E. G., and Leichsenring, J. M.: A short method of dietary analysis. J. Am. Dietet. A. 18: 429,1942.

(3) Bowes, A. deP., and Church, C. F.: Food Values of Portions Commonly Used. Philadelphia: College Offset Press, 1946.

Dietetic Practice Is Changing

Today, the dietitian is proud of the limited (small) variety of modified diets that are served to patients in the hospital. The larger hospitals have encouraged fewer varieties of modified diets during the last five years and tried to improve or make more adequate the diets they do use. This trend is merely placing emphasis on normal nutrition and attempting to make all menus nutritionally adequate.

The progressiveness of the dietary department can be judged in part by liberal planning of the regular and of the soft diet.

Nowadays, on a regular diet there are no foods that are excluded if they are edible and acceptable to the patients. In the past, baked beans, corn, cabbage, wieners, and other foods commonly used in the home had no place in the hospital diet.

The Indiana Dietetic Association sponsored the collection of regimes for the soft diet. While antiquated and nutritionally inadequate menus were still found, there was evidence of the newer trend. Puréed fruits and vegetables for the most part were no longer used by the progressive dietary department. These were replaced by whole, tender cooked vegetables and canned fruits, such as pears and peaches, orange sections, and so on. Tender meat was served as a slice rather than being "ground, scraped, or minced."

Another trend is a decrease in the length of time a patient is served a soft diet—one or two meals being the extent for many. A patient rapidly progresses to a regular diet. This short period of time, according to Henderika I. Rynbergen of New York Hospital, has justified the use of a set meal pattern, thus eliminating the need for writing of menus for soft diets.—*Excerpted from a talk by Ruth Yakel, presented before the Illinois Dietetic Association, May, 1949.*

ON THE THEME OF MILK

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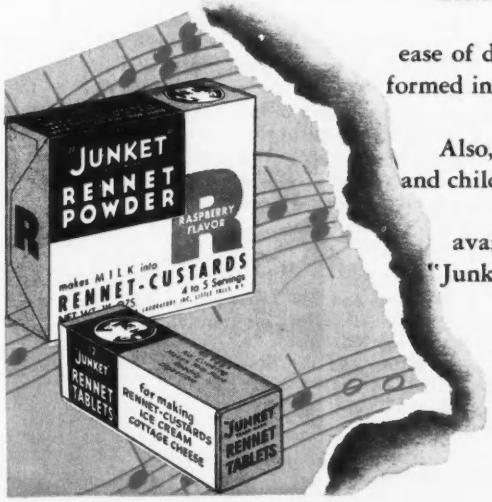

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Book Reviews

Diet in Relation to Reproduction and the Viability of the Young: Part I. Rats and Other Laboratory Animals. By F. C. Russell and M. A. Leitch. Aberdeen, Scotland: Technical Communication No. 16, Commonwealth Bureau of Animal Nutrition, 1948. Paper. Pp. 98. Price $1.21.

This review of studies of dietary requirements of laboratory animals for reproduction and lactation covers the literature abstracted in *Nutrition Abstracts and Reviews* since 1931 as well as some recent and unpublished work.

Russell states that much of the work done in nutrition laboratories has been bad and the results confused or contradictory because groups of animals used have differed in dietary history. He continues, "The practice of having test animals of standard genetic make-up is reasonably well established but it is not so well recognized that they should also be standardized in respect to dietary history. The reaction of test animals, whether to drug, galvanic battery, infective organism or experimental diet, may be profoundly modified by diet; and not only the diet on which the animal was reared but that of parents and grandparents."

It is difficult if not impossible to remove from a mixed diet one nutrient at a time to the point where the diet ceases to be satisfactory. The use of purified diets to establish requirements leaves out of account the differences in the effect of natural and purified foods on the intestinal synthesis of certain essential nutrients. Also there is an increasing amount of evidence that the dietary requirement of almost every nutrient depends to some extent on the amount of some other nutrient or nutrients in the diet. It is obvious that it will be a long time before so many individual constituents can be tested at different levels and in different combinations so it is disappointing but not surprising that little is known exactly of the requirements of laboratory animals for individual nutrients consumed either in the form of natural or purified diets.

The greater part of the bulletin is concerned with a summation of the performance of animals on various stock diets and of the studies on food consumption and energy requirements: protein, carbohydrates, calcium, phosphorus and vitamin D, potassium, aluminum, boron, fluorine, selenium, essential fatty acids and fat, vitamin A and carotene, vitamin E, vitamin K and "grass juice factors", ascorbic acid, the B-complex components, and choline.—*Ella Jane Meiller, Chicago Lying-In Hospital.*

Public Health in the World Today. Edited by James Stevens Simmons. Foreword by James Bryant Conant. Cambridge, Massachusetts: Harvard University Press, 1949. Cloth. Pp. 332. Price $5.

This most stimulating report of conferences held at the Harvard School of Public Health during 1947–48 will reward the reader, whether professional or layman. Over twenty authorities in the field of preventive medicine review their objectives and their present problems.

Unique is the presentation in one volume of the history of public health which emphasizes its broad, even world significance and the clear specific information regarding the contributions of the allied fields concerned.

The editor is Dean, Harvard University School of Public Health. The range of subject matter may be illustrated by listing a few of the chapter titles: "The Evolution of Public Health and Its Objectives" by C. A. Winslow; "The Child in World Health and Social Welfare" by Martha M. Eliot; and "New Public Health Problems of the Atomic Era" by Karl Z. Morgan.

Perhaps the dietitian and nutritionist will be tempted to turn first to "Nutrition Research and Its Relation to Public Health," the excellent critical section by Charles Glen King, Scientific Director, The Nutrition Foundation, Inc. Dr. King emphasizes the need for far more fundamental research, the importance of relationships, and three currently significant phases of study in nutrition: the early life period which serves as an intensive index, the degenerative disease period, and the desirability of long-term studies. The book, however, is so readable that any citizen wishing to be informed as to his world would do well to read the whole series in sequence.

Many definitions and descriptions are given of today's meaning of "health" and "public health." The World Health Organization in particular says: "Health is that state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity." To reach this goal, not only for the individual but for the community, the nation, and the world will require great knowledge and coordinated effort in application. Helpful in this respect are the resumés of the services of the private and official agencies, such as the U. S. Public Health Service, the Veterans Administration, the medical services of the Armed Forces, and the voluntary agencies.

References to the vital importance of food and nutrition are many and, perhaps more important, are made a vital part of each topic covered. For example, on the chapter on industrial medicine, the special needs and poor food habits of the woman industrial worker are mentioned; in telling of the postwar child health in Europe, malnutrition is described as having "prepared the way for tuberculosis"; and in describing the hazards of an older age population, obesity and its harmful results are noted.

There is no index and no bibliography. It is, therefore, not a reference book in the usual meaning of the term, but rather a descriptive, broad approach to the problem. The only pictures are photographs in connection with the prevention of ill effects from nuclear research—*Marguerite J. Queneau, Associate Nutritionist, State of New York Department of Health, Albany.*

Other New Books

Diabetes and Its Treatment. By Joseph H. Barach, M.D., F.A.C.P. New York: Oxford University Press, 1949. Cloth. Pp. 326. Price $10.

Nutrition and the Soil. By Dr. Lionel James Picton, O.B.E. New York: The Devin-Adair Company, 1949. Cloth. Pp. 374. Price $4.

Good Nutrition..

A VITAL FACTOR IN THERAPY

The sound and wholesome nutritious diet is an integral part of modern day preventive and definitive therapy. A steady stream of adequate amounts of all the essential nutritional elements is vital for good growth, maintenance of tissue structure and functioning, healing after trauma, and resistance to infection. For maintaining this daily, steady stream of nutrients, however, conditions both in health and illness often make imperative the use of an efficient food supplement along with the diet.

The *multiple dietary food supplement* Ovaltine in milk has wide usefulness for enhancing to full adequacy even nutritionally poor diets. Its rich store of vitamins and minerals includes vitamins A and D, ascorbic acid, thiamine, riboflavin and niacin, and calcium, iron and phosphorus. Its nutritionally complete protein has excellent biologic rating.

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IRON	12 mg.	COPPER	0.5 mg.

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Current Literature

Contributed by Janette C. Carlsen and Ethel M. Miller, The Johns Hopkins Hospital; Janet Engebretsen, Veterans Administration Hospital, Hines, Illinois; Quindara Oliver Dodge, Women's Educational and Industrial Union, Boston; and the Journal staff

AMERICAN JOURNAL OF DISEASES OF CHILDREN

Vol. 78, July, 1949

*Chronic relapsing pancreatitis and hyperlipemia. R. L. J. Kennedy and R. W. Collett.—p. 80.

Pancreatitis and Hyperlipemia. Prior to 1943, only twenty-six published reports had appeared on childhood pancreatitis. Symptoms generally found are: severe abdominal pain, repeated vomiting, elevation of serum lipase and amylase, glycosuria, and hyperglycemia. Cyanosis common in adults is not characteristic in children. Lipemia occurs along with diabetes and nephrosis. Co-existence of pancreatitis and hyperlipemia is not common. For that reason the case reported here is interesting as it concerns an eight-year-old child with both abnormalities.

AMERICAN JOURNAL OF PUBLIC HEALTH

Vol. 39, July, 1949

*Relation of nutrition to infection in children. J. M. Rawlings.—p. 858.

Relation of Nutrition to Infection in Children. School children, ages two to seventeen, were sent by city and county health department nurses to the out-patient department of a philanthropic health organization. Of the 315 cases seen, all but eleven, or 96.5 per cent, had some form of chronic infection. The children came from medically indigent families. An exceptionally poor nutritional status or an infection of greater than usual severity occurred sixty-three times, or in 20 per cent of all cases. Multiple conditions were common, with 65.8 per cent of all patients presenting two to five different diagnoses at the same time on the first visit. Diseased tonsils led the list and were found in 72 per cent of all cases. Supplements consisting of vitamins A, D, B-complex, and ascorbic acid with, in some cases, iron and liver were administered to 315 children for periods of three to thirty-two months. After a ten-month minimum period of observation and treatment, 82.9 per cent of the children were well, very much improved, or much improved. While the number of children seen was not many, the trend was significant. It is felt, therefore, that if dietary supplementation is administered to cases of chronic infection for a proper length of time, there would be produced, in a large majority of such children, a very real and significant reduction not only in the infections and poor nutritional status found, but also in other retardations so commonly present.

CANADIAN JOURNAL OF PUBLIC HEALTH

Vol. 40, June, 1949

*Confusion and stupidity in nutrition education. E. W. McHenry.—p. 270.

Confusion and Stupidity in Nutrition Education. The nutrition problem studied in the food habits of children in six public schools in various parts of the Greater Toronto area can be described simply. From one-third to one-half of public school children are living on daily food supplies which consist of one cup or glass of milk; a generous serving of meat; a serving of potatoes; sometimes, but not always, one other vegetable; three or four slices of bread; a piece of pie; a piece or more of cake; a bottle of soft drink; and a liberal amount of candy. Investigators are told repeatedly that the reason for the existence of this problem is economic, that mothers can't afford to buy healthful foods for children. Every study done in the past two years by this group has shown a generous use of meat despite its high price. A plea is entered that this situation can be overcome with proper educational procedures. The first obvious lesson is that those persons interested in nutrition education should get together and agree to tell the same story. Nutrition education should be simple. Nutrition education should be concentrated. Why waste time and money by spreading efforts very thinly over every possible endeavor? Emphasis should be placed on foods which are likely to be neglected most often, and time should not be wasted by urging consumption of a food which is sure to be eaten.

THE JOURNAL OF CLINICAL INVESTIGATION

Vol. 28, July, 1949

*An evaluation of human serum albumin in the treatment of cirrhosis of the liver. W. W. Faloon, R. D. Eckhardt, T. L. Murphy, A. M. Cooper, and C. S. Davidson.—p. 583.

*The effect of human serum albumin, mercurial diuretics, and a low sodium diet on sodium excretion in patients with cirrhosis of the liver. W. W. Faloon, R. D. Eckhardt, A. M. Cooper, and C. S. Davidson.—p. 595.

*Improvement of active liver cirrhosis in patients maintained with amino acids intravenously as the source of protein and lipotropic substances. R. D. Eckhardt, W. W. Faloon, and C. S. Davidson.—p. 603.

Human Serum Albumin in Cirrhosis. Concentrated salt-poor human serum albumin was administered intravenously to twenty-nine patients with cirrhosis of the liver who had fluid retention. The albumin was administered over periods varying from four days to eight months. The data were considered suitable for analysis in twenty of the patients. Of these, four patients had an immediate diuresis with loss of ascites and edema, five had a slow response in from one to the three months, and two recovered from ascites and edema after prolonged treatment of six and eight months, respectively. Nine patients were considered failures although the fluid retention was partially controlled in three by the use of a low-sodium diet. The four patients who showed immediate improvement had not required paracentesis before albumin therapy and had massive edema. Diuresis might have occurred subsequently in these patients from a nutri-

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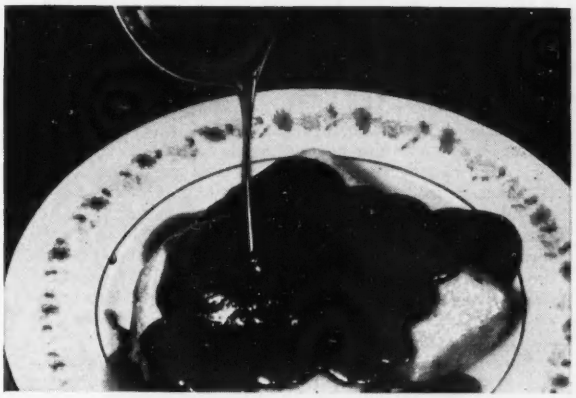

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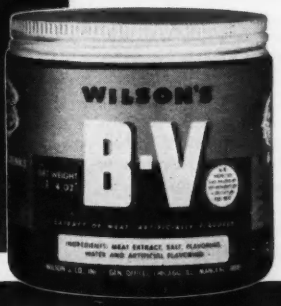

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tious diet alone. Nevertheless, albumin administration was effective by inducing an immediate, rapid diuresis, beginning before the serum albumin concentration reached normal. The slow response in seven patients cannot be definitely attributed to the albumin administered as the other therapeutic measures used concomitantly might have given as satisfactory results. It is concluded that concentrated salt-poor human serum albumin, under the conditions of this study, is neither specific for the relief of ascites nor markedly beneficial in the treatment of the underlying liver disease.

Sodium Excretion in Patients with Cirrhosis. The patients with cirrhosis of the liver with ascites reported here excreted only small quantities of sodium in the urine regardless of either the quantity of salt administered or the route of its administration (oral and intravenous). The failure to excrete sodium in amounts adequate to achieve sodium equilibrium occurred in spite of the maintenance of a normal serum albumin concentration by repeated injections of concentrated salt-poor human serum albumin. The urinary excretion of sodium was usually increased by the administration of mercurial diuretics or of salt-poor human serum albumin (intravenously) and also during a spontaneous decrease in ascites and edema formation. A low-sodium but otherwise adequate diet decreased the rate of ascites formation, while larger quantities of administered sodium led to a proportionately increased rate of formation. Although several factors might have led to the failure of these patients to excrete sodium, there was no evidence that any one was solely implicated. The relative importance of the failure to excrete sodium, of hypoalbuminemia, and of portal hypertension in the genesis of ascites could not be precisely defined.

Intravenous Amino Acids in Cirrhosis. Four patients with active cirrhosis of the liver were given a protein hydrolysate intravenously daily for from two to four weeks as the sole source of nitrogen. A purified diet furnished adequate calories, but only small amounts of choline. The amino acid solution (50 to 100 gm. amino acids) was administered in one rapid injection each morning and was well tolerated clinically. The provision of adequate quantities of amino acids intravenously permitted each of the patients to achieve a positive nitrogen blance which was not associated with azotemia or hyperaminoacidemia. There was a loss into the urine of from 3 to 23 per cent of the alpha amino nitrogen administered. This loss correlated more closely with the size of the infusion than with the speed at which it was given and did not progressively increase in any patient during the study. The individual amino acids were not excreted in the urine in the same proportion as administered, so that as a group the patients excreted fairly large percentages of administered threonine and histidine, a small percentage of arginine, and intermediate percentages of the other amino acids. Improvement was observed in all the patients during the period of study, as evidenced by a progressive decline in the serum bilirubin, degree of jaundice, and urine bile in each patient, a decrease in the size of the liver and spleen in two patients, and a distinct improvement in the histologic appearance of the liver structure in one patient. It is concluded that intravenously administered amino acids were well tolerated by these patients with severe liver disease, were metabolized and excreted in a manner differing little from normal, and permitted clinical improvement although administered as the sole source of nitrogen and of lipotropic substances.

THE JOURNAL OF NUTRITION

Vol. 38, June, 1949

Relation of iodine to the goitrogenic properties of soybeans. A. W. Halverson, M. Zepplin, and E. B. Hart.—p. 115.

Urinary excretion of amino acids and peptides by dogs fed protein hydrolysates or amino acids. R. H. Silver and C. C. Porter.—p. 155.

*The biological value of corn and wheat proteins in the male infant, with a note on the utilization of *d*-tryptophan. A. A. Albanese, S. E. Synderman, M. Lein, E. M. Smetak, and B. Vestal.—p. 215.

*The availability of vitamins from yeast. V. Differences in the influence of live yeast on the absorption of pure thiamine hydrochloride, pure riboflavin and nitrogen by human subjects, and the effect of distribution of the vitamin doses. M. Barber, M. M. Marquette, and H. T. Parsons. —p. 225.

Corn and Wheat Proteins in Male Infants. Nitrogen retention and weight gain of infants maintained on a synthetic diet in which tryptophan and lysine-supplemented-commercial zein constituted the principal source of nitrogen were inferior, by reason of the poor digestibility of the zein, as compared with those of infants on a casein diet fed at the same fluid, caloric distribution, and nitrogen levels. A diet in which tryptophan- and lysine-reinforced corn gluten provided the major source of protein also proved to be nutritionally inadequate for the infant. In contrast, a lysine-enriched wheat gluten diet supported a nutritional state in the infant comparable to that afforded by an evaporated milk formula. Evidence, albeit inconclusive, is presented which suggests that the inclusion of *d*-tryptophan in the diet may have an untoward nutritional effect.

Varying Effects of Live Yeast. A higher percentage of a dose of thiamine hydrochloride was returned in the urine of human subjects when the supplement was ingested with meals rather than between meals. The urinary return of riboflavin was not similarly influenced. Pure thiamine hydrochloride ingested with fresh bakers' yeast failed to be returned in the urine, presumably through almost complete failure of absorption by the digestive tract. This was the same effect as that observed previously in respect to food thiamine ingested with live yeast. Hence, the "interference" by fresh yeast is not attributable *per se* to the effect of an anti-enzyme in the digestive tract. In the same experiment, live yeast interfered less with riboflavin than with thiamine in that only the riboflavin of the live yeast cell, not that in the food or in pure form, appeared to be withheld from absorption. Nitrogen was least affected, inasmuch as an average of 80 per cent of the nitrogen of the yeast cell itself was returned in the urine. That these differences in excretion were actually due to differences in absorption tended to be borne out by fecal assays. These observations make necessary some further elaboration of the hypothesis that food thiamine is interfered with by live yeast because of competition between the absorbing membranes of the live yeast cell and of the digestive tract, with a resulting retention of the absorbed thiamine within the yeast cell.

THE MILITARY SURGEON

Vol. 105, July, 1949

*A palatable high-caloric high-protein drink. L. S. Mann.—p. 71.

Palatable High-Caloric, High-Protein Drink. An oral liquid feeding containing 92 calories and more than 4.5 gm. protein per ounce may be prepared as follows: Six eggs which form the base of the suspension are whipped. The whipping process is continued and the following ingredients are added in their respective order: 2 tsp. vanilla, 4 Tbsp. chocolate sirup, 25 gm. chocolate vitamin preparation, 1 pt. milk, 1 pt. cream (18 per cent), and 250 gm. powdered milk preparation. This makes a homogeneous mixture which is best served immediately after preparation and which supplies an adequate nourishment for pre- and post-operative care of gastrointestinal and thyroid cases. For patients with liver damage, the formula has been modified to lower the fat content, but yet maintaining the protein content. Skim milk is used instead of whole milk. The cream and chocolate sirup are eliminated. There are approximately 55 calories, 1 gm. fat, and 5 gm. protein per ounce.

CHIQUITA BANANA SAYS:

For two great foods in one

BANANA MILK SHAKE

Easy to make

For milk shakes-bananas fully ripe flecked with brown.

How to make BANANA MILK SHAKE

1 fully ripe banana **1 cup (8 oz.) COLD milk**

Peel banana. Slice or break into container of an electric mixer. Add milk and mix until creamy. Serve immediately. Makes 1 large drink (10 to 12 ounces) or 2 medium-sized drinks (5 to 6 ounces each).

When using a mixer which does not cut up and crush fruit, mash the banana before placing into container of mixer.

For a COLDER drink: Add about 2 tablespoons of crushed ice before mixing.

For a RICHER, SWEETER drink: Add about 2 tablespoons of ice cream before mixing.

Banana Milk Shake separates when allowed to stand...therefore serve immediately.

Banana Milk Shake is a "pep restorer"...good for everyone. It is of special value in post-operative and convalescent diets. The Banana Milk Shake contains approximately 260 calories.

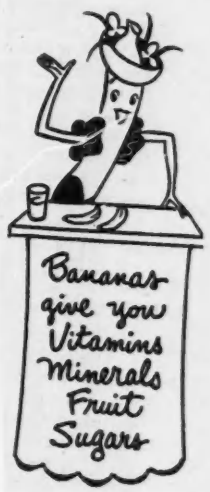
VARIATIONS

Banana Egg Nog: Before mixing Banana Milk Shake, add 1 egg.

Banana Malted Milk Shake: Before mixing Banana Milk Shake, add 2 to 3 tablespoons (½ to ¾ ounce) malted milk powder.

Banana Chocolate Milk Shake: Before mixing Banana Milk Shake, add 1 to 4 tablespoons (½ to 2 ounces) chocolate syrup.

Easy to take



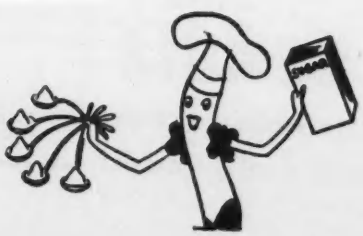
Bananas give you Vitamins Minerals Fruit Sugars

Good to drink

USE FULLY RIPE BANANAS ... PEEL WELL FLECKED WITH BROWN

Home Economics Dept., UNITED FRUIT COMPANY, Pier 3, N. R., New York 6, N. Y.

...and don't forget—
5 teaspoons of fruit sugar in every ripe banana



For bland diets, fruit diets, high carbohydrate diets—Bananas

AMERICAN RESTAURANT MAGAZINE

Vol. 33, July, 1949

*Floors can give a cheery welcome. T. Trail.—p. 42.
*More and better cakes for more and bigger profits. J. A. Cline.—p. 44.
A compact service restaurant layout. G. Zipfel.—p. 46.

Floors. Nothing can detract from the appearance of a restaurant as much as unattractive floors. Clean floors assure the public of cleanliness throughout the establishment. The two general classes of flooring materials are those that are resilient—linoleum, rubber, cork, asphalt, and wood—and those that are hard—tile, marble, travertine, terrazzo, and concrete. The composition and characteristics, as well as the kind of cleaning and polishing materials to use and those to avoid, must be known in order to maintain any floor properly. These are given for the classes listed.

Cakes for Profits. A wide variety of attractive, taste-tempting and profitable desserts can be made from cakes. The basic ingredients of flour, sugar, eggs, liquid, salts, and flavoring, and the principles involved in using various ingredients are given.

BAKERS' HELPER

Vol. 92, July 23, 1949

Fermentation fundamentals in production of bread. G. H. Eckstedt.—p. 45.
*Altitude adjustments in baking. R. M. Ormes.—p. 69.
Raisin breads. F. P. Graw.—p. 69.

Altitude Baking. The baker who wants top quality in his products should make sure the recipes he uses are intended for the altitude in which he works. Baked goods that are leavened with baking powder, cream of tartar, and soda-acid combinations are all affected by altitude changes. Bread is affected very little. Based upon experiments carried out at the Colorado Agricultural College, the following changes for cake recipes are recommended for increases in altitude above sea level up to 15,500 feet: leavening—7½ per cent reduction per 1000 ft.; fat—2 per cent reduction per 1000 ft.; sugar—2 to 2½ per cent reduction per 1000 ft. in foundation cakes, 3½ per cent reduction in angel food cakes, and 4 per cent reduction in sponge cakes; flour—above 5000 ft., 2½ per cent reduction per 1000 ft.; baking temperatures—5° F. increase per 5000 ft. Also given is a chart released by General Mills, Inc., showing the altitude changes necessary for most formulas.

HOSPITALS

Vol. 23, July, 1949

*Some tested methods that reduce unnecessary food waste. G. M. Covey—p. 64.

Tested Methods that Reduce Unnecessary Food Waste. Proper food handling is one of the key points in dietary cost control. It is essential to follow through the food preparation to insure good food products. Nineteen ways to economy are listed which include consideration of menus, avoiding unpopular foods, care in storage, careful preparation, using best possible methods of cookery, standardized recipes and portion control, left-overs used quickly and garnished attractively, temperature control during meal service, fats saved and used, and checking on careless employees to prevent food waste.

THE ICE CREAM TRADE JOURNAL

Vol. 45, June, 1949

*The outlook for vanilla. R. G. Schlotterer.—p. 76.

The Vanilla Market. The vanilla market has experienced a cycle of depression and inflation due to an accumulation of a three-year supply during the war. The chief sources of supply are Madagascar and Mexico. Madagascar attempted to stabilize her vanilla market by a destruction policy—by reducing the vanilla bean supply by 600 tons and by setting up a syndicate of local exporters. Buyers proved reluctant to purchase such goods on a controlled market. Unable to revive buyers' confidence, a free and open market was declared. Price control was then tried, but because of high prices the buyers turned to poor grades of green Mexican vanilla beans. The return to stability of the Madagascar vanilla market will mean serious losses to Mexican producers, unless the use of vanilla is increased so that larger crops can be produced and fair returns made by growers and curers on a large volume of production at moderate prices.

THE NATION'S SCHOOLS

Vol. 44, August, 1949

*Transporting hot lunches to four one-room schools. A. C. Muns.—p. 56.
School canteens in France. T. Dupont.—p. 57.

Transporting Hot School Lunches. Instead of building four kitchens in one-room schools, a main kitchen was modernized and a system was developed for transporting hot lunches in Shelbyville, Illinois. Milk in ½-pt. containers and cold food were packed in large stock pots, china and silver in special boxes, and hot foods in aluminum inserts within insulated containers so that they are hot when they reach the last school at 12:05 after leaving the kitchen at 10:30. Deliveries are made by one of the regular bus drivers who picks up the soiled dishes and containers on his return trip.

RESTAURANT MANAGEMENT

Vol. 64, June, 1949

*Equipment maintenance manuals. A. H. Clawson.—p. 48.
Serving late suppers to teen-agers. M. L. Casteen.—p. 58.

Vol. 64, July, 1949

*How a homespun training program cut our service staff in half. L. O. Spiros.—p. 36.
*Equipment maintenance manuals. A. H. Clawson.—p. 38.
*Effective posters for food handlers.—p. 44.

Maintenance Manual. The cleaning and operating of a pre-rinse machine are discussed in this article. The cleaning of a two-tank, conveyor-belt-type machine and dish tables is also considered.

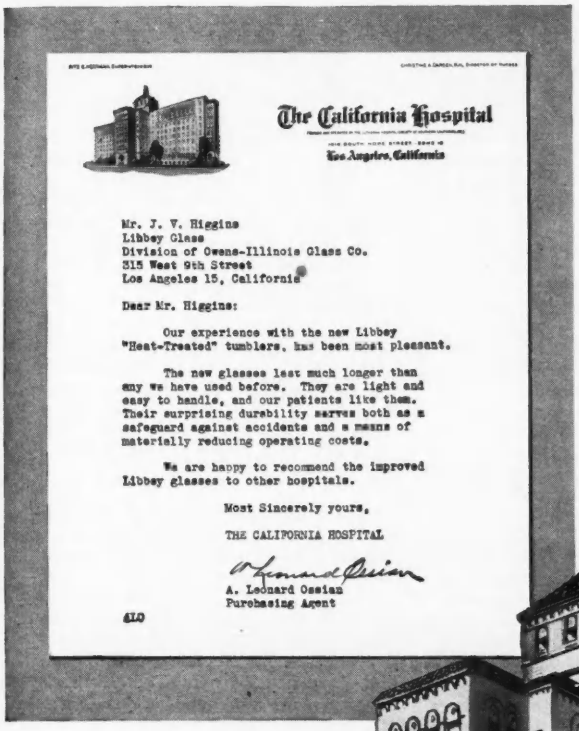
Waitress Training Program. A simple training program for waitresses initiated in a Milwaukee restaurant has resulted in a decrease of the number of waitresses on the payroll from twelve to six, has cut dish replacements from $25 a month to less than $10, and has doubled the volume of business. This program consists of first putting the new employee at ease at a luncheon with the manager during which the correct way to serve is demonstrated and important points are discussed. Luncheon is followed by demonstrations of other details, such as cleaning the coffee urn, making correct change, keeping counters and tables clean, and methods for polishing equipment. Then the new waitress is turned over to another waitress under whom she will work.

Dish Machine Maintenance Manual. A detailed chart for the operation of a two-tank, conveyor-belt-type dish machine is presented, covering the equipment, supplies, and cleaning materials needed as well as step-by-step instructions on what to do and how to do it.

Sanitation Posters. Ten 13 by 10 in., colored sanitation posters for food handlers which will serve as constant reminders on cleanliness when hung in kitchens, rest rooms, or on bulletin boards are available for $1.00 postpaid from the Massachusetts Restaurant Association. These were developed by the Association in cooperation with the Boston Health Department.

THE CALIFORNIA HOSPITAL REPORTS

LIBBEY HEAT-TREATED TUMBLERS . . .



The California Hospital
Los Angeles, California

Mr. J. V. Higgins
Libbey Glass
Division of Owens-Illinois Glass Co.
315 West 9th Street
Los Angeles 15, California

Dear Mr. Higgins:

Our experience with the new Libbey "Heat-Treated" tumblers, has been most pleasant.

The new glasses last much longer than any we have used before. They are light and easy to handle, and our patients like them. Their surprising durability serves both as a safeguard against accidents and a means of materially reducing operating costs.

We are happy to recommend the improved Libbey glasses to other hospitals.

Most Sincerely yours,

THE CALIFORNIA HOSPITAL

A. Leonard Ossian
Purchasing Agent

ALO

Safe-Economical!

REDUCE replacement costs . . . safeguard against accidents with Libbey Heat-Treated Tumblers. This is the advice of Mr. A. Leonard Ossian, Purchasing Agent at The California Hospital in Los Angeles, California.

This durability of Libbey Heat-Treated Tumblers will prove valuable to *your* operation, too. Once you try them, you will find, as hundreds have, they last 3 to 5 times longer, reduce replacement costs, lower investment, and save on storage space.

Every one of these famous tumblers is backed by the Libbey guarantee: "A new glass if the 'Safedge' ever chips." Ask your supplier to show you samples, or write directly to us.

One of the largest hospitals in the Los Angeles area, The California Hospital enjoys an excellent reputation. Future plans call for further expansion and modernization of facilities.

GUARANTEED
A NEW GLASS IF THE SAFEDGE EVER CHIPS

LIBBEY GLASS

Libbey HEAT-TREATED

Libbey Glass Company, Toledo 1, Ohio

News Notes

A. A. A. S. Meeting. The 116th Annual Meeting of the American Association for the Advancement of Science is scheduled to be held December 26 through 31 in New York City, with the Statler Hotel as headquarters. The A.A.A.S. has 211 affiliated and associated societies and state academies of science, plus about 45,000 individual members, which makes it the largest scientific organization.

As an affiliated society, the A.D.A. will again sponsor one session during this meeting, which will be held on December 27 at the Governor Clinton Hotel. Members of the committee, all of New York City, appointed to plan the program are: Chairman, Dr. Clara Mae Taylor, Associate Professor, Teachers College Columbia University; A. June Bricker, Home Economics Bureau, Metropolitan Life Insurance Company; and Mary Ross, Nutrition Consultant.

Brucellosis Meeting. A symposium on brucellosis was held at the National Institutes of Health, Washington, September 22 and 23, at which veterinary, public health, clinical, bacteriological, and control aspects of the disease were considered. Sponsors of the meeting were the Bureau of Animal Industry, the National Research Council, and the National Institutes of Health.

New FAO Committee. In September, a new Committee on Calorie Requirements met in Washington under the sponsorship of the Nutrition Division of the Food and Agriculture Organization. Proposals were considered for defining scales of calorie allowances applicable to widely different types of populations and conditions. Members of the committee who attended the meeting came from Belgium, U. S., Scotland, Brazil, France, Holland, and Australia.

Pan American Sanitary Organization. A new Hospital Section has been organized within the Pan American Sanitary Organization, with Felix Lamela as Chief. The new section will serve as a technical consultant office to the participating governments and will give help on problems of surveying, planning, and equipping. Modern methods of administration and management of hospitals will be dealt with when requested by the ministries of health of the various Pan American countries.

The Pan American Sanitary Bureau is also the Regional Office of the World Health Organization and has its offices at 2001 Connecticut Avenue, N.W., Washington, D. C.

Dietetic Interns Graduate. Three dietetic interns at the *Shadyside Hospital*, Pittsburgh, were honored at a graduation dinner on August 22, at which they received graduation certificates and pins. The interns who graduated are: Gloria MacFarlane, Indiana State Teachers College; Sara Spicer, Hood College; and Aleva Bengamin, Montana State College.

At *Texas State College for Women*, Denton, a tea was given to honor five dietetic interns who completed their administrative dietetic internship in August. They are: Ora LeAyo, Southwestern Louisiana Institute; Doris Klindfelter, University of Illinois; Marjorie Rountree, Southwestern Louisiana Institute; Jo Ann Savary, Florida State University; and Christine Sutton, University of Arkansas.

A dinner ceremony on August 30 marked the climax of the year's internship for seven dietetic interns at the *University of Oklahoma Hospitals*, Oklahoma City. The interns who received certificates and A.D.A. pins are: Mary Agnes Demere, Mary Emil Sundberry, Sylvia Budd Bobek; Frances Elizabeth Johnson; Dorothy Norman Brooks, Nadine Noyes Elman, and Martha Glenn McCarley.

On June 29, at a simple ceremony, seventeen girls completed their dietetic internship at the *Johns Hopkins Hospital*, Baltimore. The graduates are Barbara Burns, Barbara Ann Carpenter, Mary Helen Gauche, Mary Agnes Gill, Poppy Joan Gomatos, Margaret E. Haupt, Joan Holbrook, Elizabeth Houlehin, Barbara Jane Hutchiss, Margaret Ann James, Jane Hanlon Murphy, Raida Nebeker, Virginia Marie Smith, Norma Mae Stone, Bettie Stovall, Margaret Dole Sturges, and Zelda Thompson.

U.S.P.H.S. Examination. Examinations for Sanitarian Officer (Nutritionist) in the U. S. Public Health Service Regular Commissioned Corps will be held November 14 through 16 at various points in the U. S. Completed applications must be in the Washington office by October 17.

Appointments will be made in the grade of Senior Assistant Sanitarian (equivalent to the Army rank of Captain). Entrance pay is $4053.50 (without dependents). Benefits include periodic pay raises and promotions; retirement provision, medical care, and annual and sick leave.

Applicants must have a master's degree with a major in nutrition from an approved college or university; have successfully completed an approved hospital dietetic internship; and have ten years' post-high school training and experience. Application forms and additional information may be obtained from the Surgeon General, U. S. Public Health Service, Washington 24—Attention: Division of Commissioned Officers.

Australia Dietetic Council. Australia is now forming a Dietetic Council which will have its first meeting in May, 1950. This will afford an opportunity to develop the profession of dietetics on a national basis. It will also offer an opportunity of discussing with dietitians from all parts of Australia problems common to the profession.

The fourteenth annual meeting of the Victoria (Australia) Dietetic Association was held April 4, 1949. At this meeting the following new officers were elected: President, C. N. Turner; Vice-Presidents, J. Millis and S. Sutherland; Hon. Secretary, D. Schumer; and Hon. Treasurer, E. Topp.

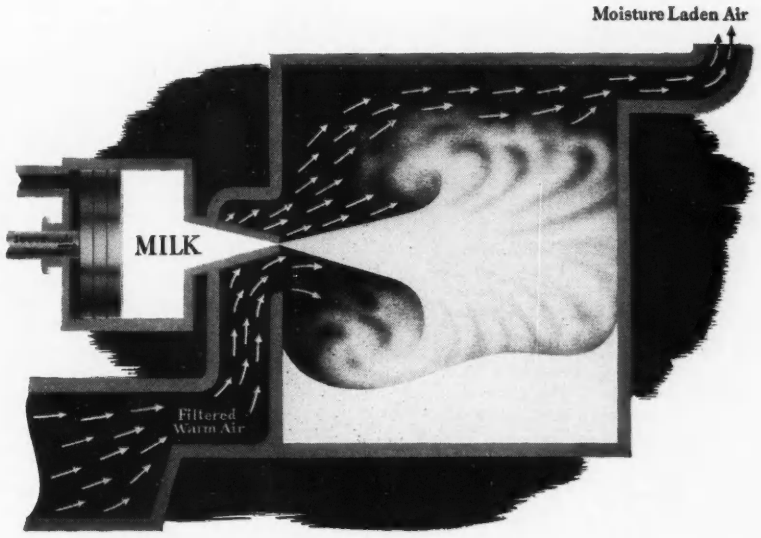
Food Acceptability Course. The Illinois Institute of Technology, Chicago, is offering a graduate course in food acceptability techniques for the fall semester.

The course will be designed to review the methods of evaluating public acceptance of food products. Advantages, disadvantages, and limitations of present practices of food evaluation will be stressed. Col. Rohland A. Isker, Secretary of the Associates Food and Container Institute, will direct the course

Diabetes Association Staff Appointment. J. Richard Connelly has recently accepted an appointment as Executive Director of the American Diabetes Association. Mr. Connelly will also act as Business Manager of the Association's magazine, *ADA Forecast*, and other publications.

Col. Lawrence Receives New Appointment. Colonel Charles S. Lawrence has accepted an appointment as Executive Secretary of the Council of the Institute of Food Technology. He assumed his duties October 1 in Chicago at the national headquarters. Before his retirement from the Army, he was commanding officer of the Quartermaster Food and Container Institute and in this capacity worked closely with industrial firms and their staffs concerning the food problems of today.

Government Publications. The U.S. D.A. *Bureau of Human Nutrition and Home Economics* has prepared *School Lunch Recipes for 25 and 50*, PA-68. The booklet includes forty recipes in seven categories: soups and chowders, main dishes, vegetables, salads and salad dressings, breads, desserts, and sauces. The recipes are scaled down from those developed earlier by the Bureau on a



How dependable are dehydrated milk products?

DO THEY CONTAIN all the nutritive values needed to meet certain specific dietary needs in a palatable form?

That's what doctors and nutritionists often ask. The answer is simply: Some do and some don't. It depends on safeguards and quality control steps taken above and beyond the minimum standards established by law.

It's in the area of *extra* quality control that most is accomplished in retaining flavor and nutritive values.

Q. How is milk usually dehydrated?

A. In the dry milk industry, the principal methods of dehydrating milk are by roller drying and spray drying. The latter process, pioneered by Borden, is the most widely used method. In this process, milk is sprayed into a current of hot air that flows through a large closed chamber. As the milk strikes the hot air, the water in it evaporates—and the dried milk particles are precipated.

Q. What extra Quality Control steps does Borden take in milk dehydration?

A. 1. Borden quality control starts with raw milk received from the farms. Milk that is to be dehydrated must conform to the high standards applied to milk bottled for daily delivery. To further insure quality, the milk is dried the same day it arrives at the plant.

2. In Borden's method of spray drying, the temperature and rate of flow of the air in the spray box are carefully regulated to keep the surface temperature of the milk particles below the level at which changes occur in protein composition. This exacting control guards flavor, assures uniformity and maximum retention of nutritive values, including milk's natural vitamins.

3. During processing, at least two dozen laboratory checks are made. At no point is the milk exposed to the open air. Packaging is completed by automatic machines, and dry milk hermetically sealed in tins is packed with an inert gas to maintain quality.

Borden's dehydrated milk products are dependable—for they contain milk's nutritive values in a palatable form.

And this is one important reason why The Borden Company is a leading manufacturer and supplier of dehydrated milk products that are dispensed on doctors' prescriptions—and of other dehydrated milk and food products for general consumer use.

BETTER NUTRITION THROUGH RESEARCH AND QUALITY CONTROL

The *Borden* Company

350 Madison Ave., New York 17, N. Y.

MANUFACTURERS AND DISTRIBUTORS OF BIOLAC, MULL-SOY, BETA LACTOSE, KLIM, DRYCO, BORDEN'S ICE CREAM, EVAPORATED MILK, CONDENSED MILK, HEMO, INSTANT COFFEE, FRESH MILK AND CHEESE

100-portion scale. The booklet also has information on using dried whole egg and non-fat dry milk.

The *Bureau of Human Nutrition and Home Economics* has recently released the first of a new series of "Commodity Summaries" which are to be based on the results of studies of food consumption made in 1948 in Birmingham, Buffalo, Minneapolis—St. Paul, and San Francisco. This first report deals with meat consumption. In it, the meat selections of cities families are described, and some of the factors affecting consumption are discussed. The second report in the series will cover "Fats and Oils." Other parts of this series are to be released later.

Vitamins in Walnuts. The California *Home Economics* has released the first two pamphlets of a new series of "Commodity Summaries" which are to be based on the results of 1948 studies of food consumption in Birmingham, Buffalo, Minneapolis—St. Paul, and San Francisco. The first report deals with meat consumption. In it, the meat selections of city families are described, and some of the factors affecting consumption are discussed. The second report in the series covers "Fats and Oils." Other parts of this series are to be released later.

Fruit Consumption. The U.S.D.A. Bureau of Agricultural Economics' figures on fresh fruit consumption in this country show that 40 lb. oranges, 25 lb. apples, 20 lb. bananas, and 17 lb. peaches per capita are eaten annually.

Plentiful Foods. The following foods are expected to be plentiful in October:

Fresh fruit and Produce

Apples	Lettuce
Cabbage	Pears
Grapes	Sweet potatoes

Miscellaneous foods

Almonds	Honey
Chicken	Pecans
Corn, canned	Peanut butter
Dairy products, manufactured	Pork products
Fats, cooking	Turkeys

The Department of Agriculture also suggests that the following foods, although not on the "plentiful" list, be given some attention:

Beans, frozen Lima
Beans, snap (east of the Rocky Mountains)
Eggs, small size and grade B
Potatoes, Irish (in Northeast)

Uses for Whey. The Bureau of Dairy Industry, U.S.D.A., suggests that whey, usually an unmarketable by-product fed to farm animals, can be used commercially in cookies, doughnuts, sweet rolls and other breads as well as soups and sherbets. Research has shown that a number of breads and baked goods, when made with whey, are superior in flavor, texture, volume, nutritive value, and crust color. Baked goods containing whey are more tender than those made with water or milk, and also hold their fresh-baked qualities several days longer. The protein of the whey may replace as much as 20 per cent of the egg protein generally used in such products as chocolate cake, yellow layer cake, sweet rolls, doughnuts, and cookies. In addition, when skim milk is used with whey, sweet baked goods are less crumbly.

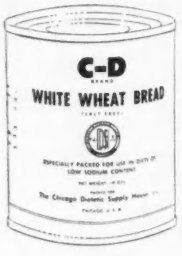
Developmental work has also produced a method of manufacturing a dried mixture of whey and potato which can be used in soups and bread. Dairy scientists have also announced a way of making sherbets from whey in which whey solids replace the ice cream mix or the non-fat milk solids generally used.

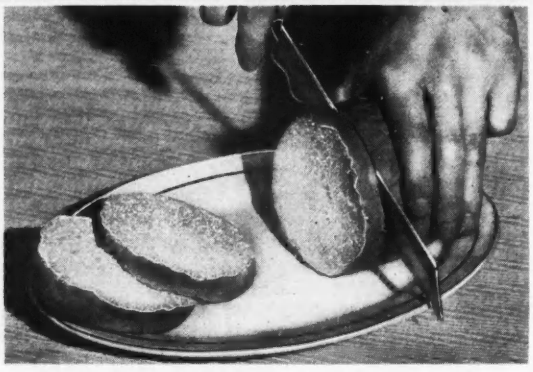
Family Food Purchasing in the U. S. The U.S.D.A. Bureau of Human Nutrition and Home Economics recently reported on a study of family food purchasing. Some 1600 families in 68 cities were interviewed. The survey showed that these families spent an average of 32 per cent of their total weekly income in 1948 for food, as compared with 26 per cent in 1942.

Families with incomes of $7,500 or more spent $44.08 a week for food, those with $3,000–4,000 income spent $27.06, whereas the under-$1,000 families spent $13.76. The high-income group used twice as much milk, eggs, meat, poultry, and fish, and three times as much fresh fruit per week as the lowest bracket.

Compared with the spring of 1942, the families studied in all income groups were using 8 per cent more citrus fruit and tomatoes in 1948, 21 per cent more of other vegetables and fruits, 23 per cent more meat, poultry, and fish, 11 per cent more eggs, and 49 per cent more sugar and sweets. On the other hand, they used 18 per cent fewer potatoes and sweet potatoes.

For the LOW SALT DIET





SALT-FREE WHITE BREAD

Tasty and Nourishing—Convenient to Use

For the cardiac patient, and others whose sodium intake must be limited. C-D WHITE WHEAT BREAD is a yeast bread, prepared without the use of salt or milk. Baked in tins and sealed as soon as it leaves the oven, to protect freshness and flavor. Natural sodium content: 0.024%.

SEND FOR INFORMATION
Useful information on CELLU FOODS for low Salt Diets available on request.

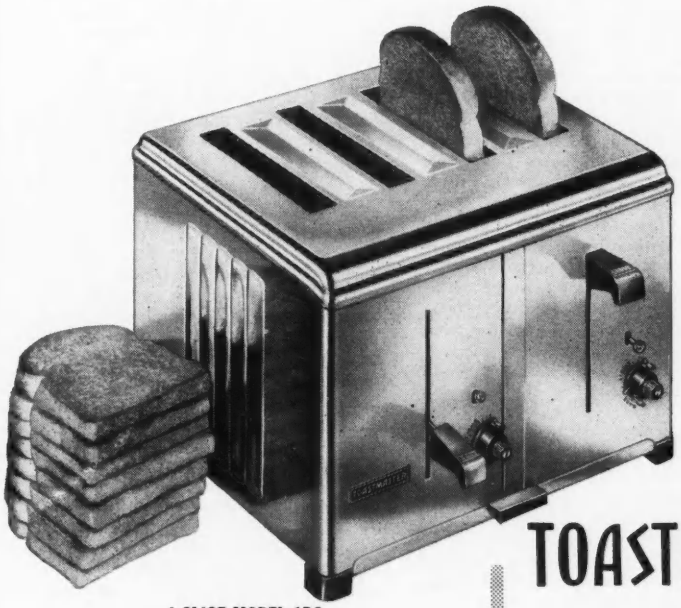
CHICAGO DIETETIC SUPPLY HOUSE, INC.
1750 W. Van Buren St. Chicago 12, Ill.

News of State Associations

California Dietetic Association. The following have been elected officers of the *Los Angeles Section* for 1949–50: Chairman, Florence McGucken; Vice-Chairman, Margaret Stewart; and Secretary-Treasurer, Alice McMillan.

Indiana Dietetic Association. On March 5, the Indiana Dietetic Association held a career day at the Indiana University Medical Center. Fifty-three representatives from seven colleges attended. Guests included college students, their instructors, and members of the Indiana Dietetic Association. Activities during the day included a diabetic clinic conducted by Dr. C. L. Redesill and a tour of the Indiana University Medical Center campus, including the dietary department. Talks were planned to include information on the various phases of dietetics, and one dietetic intern told about her work and training.

Another public relations activity of the Indiana Association was the exhibit it sponsored at the Indiana State Fair held the first week in September in Indianapolis. For this event, the national Associa-



4-SLICE MODEL 1D2
Toasts over 250 slices per hour.
$99.50, Fair Trade Price.
(Fed. Excise Tax Incl.)

TOASTMASTER TOASTERS

come in six sizes to suit every hospital . . . large or small!

WHATEVER YOUR HOSPITAL'S SIZE, there's a "Toastmaster" Toaster to fit your needs. Sizes range from the 2-slice model on up to the 16-slice—with capacities from 125 to 1000 slices per hour.

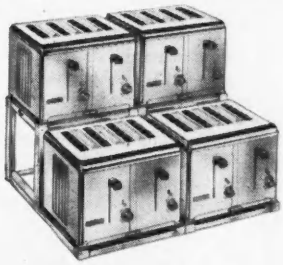
HERE IS TOAST THAT'S perfect every time. No scraping, no retoasting, no time lost or bread wasted. The "Toastmaster" Toaster is completely automatic, requires no watching, no waiting. Bread is simply dropped into slots—the lever is pressed down—and when done to perfection, toast pops up and current shuts off. So, your personnel can make toast while attending to other duties.

THIS TOASTER GIVES YOU operating economy, too. It needs no preheating. It uses current only while toasting . . . and each pair of slots is individually controlled. So, it saves on electricity.

SOLID, HEAVY-DUTY CONSTRUCTION gives the "Toastmaster" Toaster that extra margin of strength to meet the demands of institutional use. Its extra-thick chromium-plated finish is durable and easy to keep clean.

TRY PUTTING A "Toastmaster"* Toaster on diet-kitchen duty. You'll be happily surprised at the time and steps it saves. More and more hospitals are constantly supplementing their main-kitchen toasters in this manner. See if you, too, don't discover that less time is spent on food service—more, on other tasks. Call your food-service equipment dealer, today.

A Toaster for every Hospital Need!



FOR THE MAIN KITCHEN . . . The 16-slice, Model 4-1D2-D (above), is ideal for hospital main kitchens. That's because it has plenty of toasting capacity—pops up over 1000 slices per hour!

$410.00, Fair Trade Price.
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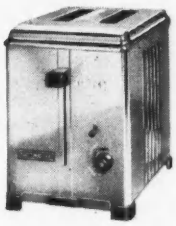
FOR THE DIET KITCHENS

The 2-slice, Model 1BB4 (right), is perfect for diet kitchens. It pops up over 125 slices of toast per hour. Equipped with cord to plug into any wall outlet.



$52.00, Fair Trade Price.
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"Of course . . . it's Electric!"

TOASTMASTER
AUTOMATIC POP-UP TOASTERS

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tion's exhibit "Dietetics—A Career with a Choice" was used to create interest in the profession.

The following officers for 1949–50 were elected at the spring convention held April 29 and 30 at Indianapolis: President, Kathryn Sheedy; Vice-President, Martha McBride; Treasurer, Hazel Wessell; and Secretary, Ada VanNess.

South Carolina Dietetic Association. South Carolina has found itself with a great turnover of officers during this year, the first resignation being from Vice-President Mary Dwyer who has accepted a position at the Chicago Quartermaster Food and Container Institute. Emily V. Lee was appointed to fill her vacancy. Then when Marguerite McInteer, President, left the state to join the faculty of Southwestern Louisiana Institute, Lafayette, Mrs. Lee became President.

At the spring meeting in Columbia, South Carolina, the principal speaker was Irene Yates, who had recently returned from serving as an exchange teacher in England. Her speech, "Thoughts on British Socialism," was most enlightening. Plans are now in progress for the fall meeting on October 29 in Columbia.

Tennessee Dietetic Association. At the May meeting of the *Memphis Dietetic Association*, Dr. N. E. Rossett, Chief, Gastro-Intestinal Section, Kennedy Veterans Administration Hospital, lectured on "Dietary Management of Peptic Ulcer."

The Memphis Association prepared an unusually successful exhibit for the Memphis Food Show, April 23 to May 1. Space for the exhibit was made available to the group through the courtesy of the Memphis Dairy Council. The exhibit itself showed pictures of "Gloomy Gus" who eats a poor diet, and "Happy Joe" whose diet is adequate in all respects. Below the pictures were shown the foods that each eats, while blinking red, yellow, and green lights served as the attention-getting mechanism for the exhibit. To tie in with the pictures, "Grin or Grouch," a pamphlet by the Dairy Council, was distributed to all those who visited the booth. Many favorable reactions were noted, and the Association was also asked to display the exhibit for a week at East High School.

Washington State Dietetic Association. The project of the Food Administration Section of the Washington State Dietetic Association this year has been in cooperation with the State Department of Health on the National Hospital Planning program. After an initial contact by letter, several meetings were held in the offices of the State Health Department so that the project committee might become acquainted with the state's program.

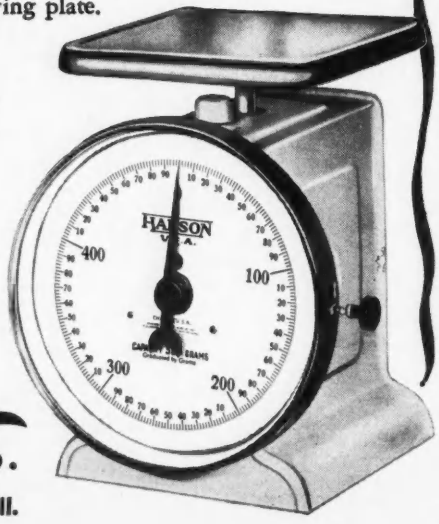
The committee then was able to give intelligent help, which has included:

(a) An evaluation in terms of local needs, using the U. S. Public Health Service booklet, "The Twenty-Five Bed Hospital—Suggested Planning and Equipment" as a guide.

(b) Preparation of a work schedule for dietary personnel in a twenty-five bed hospital, along with a job description for the various jobs.

(c) Preparation of a budget for the dietary department of a twenty-five-bed hospital based on hourly rates of local labor markets and local wholesale prices.

(d) A review of plans for four hospitals.

HANSON
DIETETIC SCALE
The standard diet scale of the medical profession for controlled diets. Rotating dial eliminates computation as each item of food is added on the serving plate.
Capacity 500 grams by grams. Stainless steel platform, white enamel body, easy to keep clean.
Model 1411 (illustrated) has glass protected dial, price $15.00
Model 1440 enamel dial, price $10.00
See your Supply House


HANSON SCALE CO.
Est. 1888
525 North Ada St., Chicago 22, Ill.

Association Activities

New CARE Book Program. CARE has begun a new service to send books overseas to revitalize war-devastated libraries. It will work in conjunction with UNESCO, the Library of Congress, the American Library Association, and others. In operation, the program provides for new books to be purchased and distributed where they are needed most, and it will operate on the basis of individual contributions. Categories have been established from which the donor may select. These categories include medicine—which covers the fields of dietetics—chemistry, mathematics and the exact sciences, as well as engineering, teacher education, sociology, and psychology. In addition to selecting a particular category, the donor may choose both the country and the institution to which he wishes to send the books. The ultimate selection of the title will be made by CARE's Advisory Committee, headed by Luther Evans, Librarian of Congress.

To call this program to the attention of dietitians working on the A.D.A. Professional Education Section project on Assistance to Foreign Libraries, copies of CARE's folder describing this program were included in the July mailing of the A.D.A. *Courier*. Although this project has been primarily concerned with furnishing libraries with back numbers of scientific journals and publications, this new CARE service will be of interest to members and state and local associations that may wish to contribute new books.

News of Advertisers

The *Market Forge Company* has recently developed a new, counter model pressure cooker called "Steam-It." The new cooker operates under pressure from 5 to 15 lb. With it, cooking can be done in standard cafeteria pans 12 by 20 in., either 2½, 4, or 6 in. deep, perforated or solid. This gas-fired pressure cooker now can be used by the small food service operator to prepare pressure-cooked vegetables quickly and at small expense. To install, only a gas line is required—no steam line—for the Steam-It generates its own steam. Shelf and pan supports can be taken out for cleaning, and the door handle and door are also removable, thus making sanitary care of the unit easy.

A new line of "LeGout" gelatin desserts has been put on the market by *Fearn Laboratories, Inc.* The new desserts are available in 24-oz. packages, the standard size for mixing with 4 qt. water, and also in 10-lb. cans. They come in six flavors: strawberry, raspberry, cherry, orange, lemon, and lime.

does TALK *work for you?*

It's never too early to plan *extra* good meals. For they influence people to talk enthusiastically about those meals. Just be sure to utilize the *extra* goodness of General Foods institution products such as Jell-O, Log Cabin Syrup, Snider's Condiments, and Post's Cereals.

MAIL YOUR PRIZE COUPONS FOR XMAS GIFTS BEFORE DEC. 1st

And remember that almost all General Foods institution products are packed with valuable prize coupons. Use them for all sorts of Xmas gifts. There are large, medium, and small gifts available, some for as few as 70 prize points. If you haven't a General Foods Prize Catalog, listing the hundreds of prizes, write for your free copy today.

To receive your selections in time for Christmas, be sure to mail us your prize coupons and gift choices *before* Dec. 1st. General Foods Premium Dept., Battle Creek, Mich.

Buy General Foods BECAUSE...

- a line of national favorites
- packed specially for quantity servings
- adequate service from coast to coast
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PEOPLE WHO TALK ABOUT GOOD FOOD ...TALK ABOUT GENERAL FOODS!

MALTEX points the way to a GOOD BREAKFAST

The need for nourishing breakfasts is a universal one . . . and Maltex Cereal will help you to put them across. So delicious. So rich and nut-like in flavor . . . because it's Toasted Wheat and Malted Barley in ideal combination. So temptingly, naturally sweet. Everybody likes Maltex. A perfect base for nutrition-right breakfasts.

Write today for this new and helpful material

Daily Diet Record—Colorful plan sheet giving Basic Seven food items.

Recipes for Serving 100 People—Four color booklet of nourishing and taste tempting recipes.

Be Dietwise—a practical and scientific guide to reducing.

Offer limited to localities north of Washington, D. C. and east of Chicago. Send a post card TODAY to:

Home Economics Department

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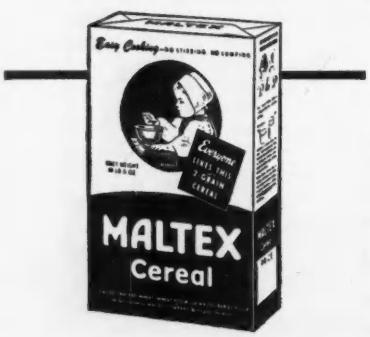
Burlington, Vt.



The Home Economics Division of *Swift and Company* has released a new booklet *The Meat Makes the Meal*. Planned to help the housewife in meal planning and meat purchasing, meats are classified according to the method of cookery, i.e., broiling meats, steaks, oven and pot roasts, braising meats, variety meats, and so on. Clear illustrations of each cut or type of meat supplement the test.

On August 23, *General Foods Corporation* opened a new warehouse at Camp Hill, Pennsylvania. This warehouse will provide service to the states of New York, Pennsylvania, Maryland, Virginia, North Carolina, South Carolina, Georgia, and Florida.

General Foods has announced that it is now importing Ridgways "Her Majesty's Blend" tea for the first time since the war. It is being distributed to the finer specialty stores throughout the country. This blend was originally mixed more than sixty years ago by Ridgways Ltd., London, to please the late Queen Victoria.

General Foods won the third annual distinguished service award of the Special Devices Association. The Association is made up of naval reserve officers and civilians who chose the winner for outstanding accomplishment in rapid learning techniques and mass training during and since the war.

The *National Dairy Council* has prepared two leaflets entitled, "Ice Cream . . . Its Food Value" and "Milk . . . Its Food Value." The ice cream booklet contains scientific information on the food value of this product, while the booklet on milk gives similar information on the nutritive value of milk, including an overall view of recent and current research. The Dairy Council has also compiled statistical material on consumption of dairy products in the form of a booklet, *How Americans Use Their Dairy Products*. It gives information on per capita consumption and production of butter, cheese, milk, ice cream, and other dairy products. The trends in consumption as well as changes in retail food prices are also presented.

The *Cleveland Range Company* has announced a new model steam cooker. It is a single-compartment steamer holding three standard cafeteria pans, taking up 22 in. of space. This Steamcraft Cub model is of stainless metal with fiber glass insulation and is equipped with an electric clock control for both cooking and holding heat.

A complete new line of fruit jellies has been added to *H. J. Heinz'* products. There are eight flavors: currant, grape, elderberry, blackberry, red raspberry, cherry, crabapple, and apple.

Mead Johnson & Company has released a booklet titled "High Protein Recipes," which features recipes using Casec and Protenum. For each recipe the foods containing appreciable amounts of protein are starred, and the nutritive value of the recipes, according to protein, carbohydrate, fat, and caloric content is listed.

"Where Food is Finest" is the title of a new 16-mm. color-sound film, prepared by the Industrial and Commercial Gas Section of the *American Gas Association*.

Army Announcements Concerning Personnel

The Department of the Army has released the following official list of names of dietitians in the Women's Medical Specialists Corps who have been separated from service:

1st Lt. Mildred Banning, R-2407, 1925 Kent Rd., Duluth, Minn.
1st Lt. Mary C. Hickman, R-10050, Moscow, Idaho
1st Lt. Margaret S. Mathes, R-916, 135 Ivanhoe St., S. W., Washington, D. C.

Mary A. Neacy, R-10059, has been promoted from the rank of Second Lieutenant to that of First Lieutenant.

U. S. Public Health Service Appointments of Dietitians

The following appointments of dietitians have been made to the Public Health Service, in the period since October 1948 to September 1, 1949:

Name	Position or Rank	Place
	Commissioned Corps	
Arlene M. Luthi	Senior Assistant Dietitian	Seattle, Wash.
Patricia M. Waring	Junior Assistant Dietitian	Staten Island, N. Y.
Letitia Warnock	Junior Assistant Dietitian	Boston, Mass.
Katherine A. Seubert	Junior Assistant Dietitian	Baltimore, Md
Lois F. Soultanian	Junior Assistant Dietitian (R)	Ft. Worth, Tex.
	Civil Service	
Irene F. Zaladonis	Head Dietitian	Baltimore, Md.
Pauline G. Dietz	Head Dietitian	Ft. Worth, Tex.
Sarah C. Brown	Staff Dietitian	Savannah, Ga.
Ruth E. Gilbert	Staff Dietitian	Ellis Island, N. Y.
Eleanor M. Eccleston	Staff Dietitian	Norfolk, Va.
Helen R. Stafford	Staff Dietitian	New Orleans, La.
Martha Thomason	Nutritionist	Brattleboro, Vt.
Elizabeth Heap	Nutritionist	Jacksonville, Fla.
Edna Brown, Ph.D.	Chief Nutritionist	Washington, D. C.
Marjorie Grant	Nutritionist	Newton Center, Mass.
Pearl Thoreson	Nutritionist	Newton Center, Mass.